..THE IRON AGE..

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FINANCING REPLACEMENT THROUGH COST REDUCTION

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THERE are three schools of thought on the subject of instalment selling. One holds to the position that it is a heaven-sent boon to industry, an infallible and faultless business stimulant. Another asserts that it has wrecked our national character by inducing an orgy of extravagance, that it tends to cause inflation and prolong depression and is, in general, an unmitigated blight upon society. A third looks upon it as an economic instrumentality with potential advantages and potential disadvantages, depending upon its manner of use, something whose net effect must be judged not on the basis of prejudice either for or against but by the proof of accurate statistics.

Instalment Selling an Economic Instrument

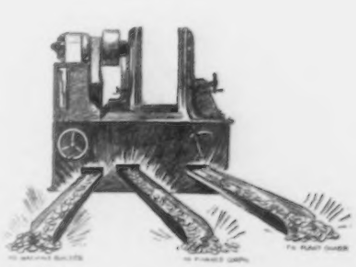
In the last category belong the great national and international commercial banking houses that discount instalment paper. These naturally regard instalment selling, properly regulated, as economically and socially advantageous, or they would not handle paper of that class. They do not for a moment, however, regard it as the be-all and end-all of economic wisdom or as a fool-proof institution.

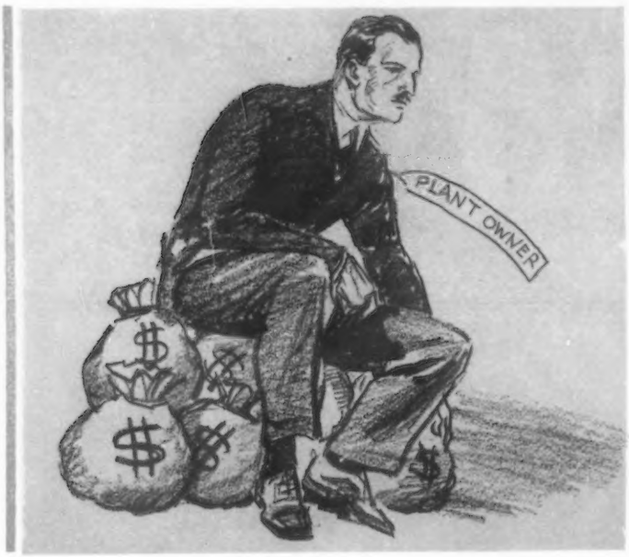
Their carefully compiled statistics have proved beyond argument that under such regulatory measures as they apply, instalment selling is not an inflationary factor and neither produces nor prolongs depression. They know from the experience of two severe depressions that its losses in depressed periods are not enough greater than those of normal periods to affect the general economic scheme of things appreciably and that their own profits in such periods, as a consequence of that fact, hold up better than those in many other lines of business.

Outstandings Are of Brief Duration

They know that the average note outstanding in the greatest of all instalment selling fields, the automobile market, when the present depression began had only some four and three-quarters months to run, so that the great bulk of automobile paper due at that time was wiped off the books before the depression had run a quarter of its course.

Their credit departments know from experience that the average risk offered during a depression is of higher rating than the average risk of a normal period, because people who are not exceptionally sure of their ability to pay out on instalment contracts are not inclined to undertake such contracts at a time of general caution. Therefore, once depression sets in, in-





stalment credits tend to safeguard themselves through the more general prevalence of conservative psychology.

An Industrial Stimulant but Capable of Abuse

They know from the testimony of industrial leaders in many lines that instalment selling thus soundly regulated has prompted the expansion and prosperity of those industries as no other known instrumentality could have done, and from the testimony of buyers who have used the instalment principle intelligently they know that it is quite as capable of promoting a spirit of thrift as one of extravagance. It is, I think, obvious that if it did promote a general spirit of extravagance, the institutions that discount instalment paper could not live because of their losses. The fact that those losses have been at all times moderate while losses on other, and shall we say, competing forms of credit have also remained moderate, would seem to prove that in general instalment selling has had no such effect.

Being therefore convinced, through a process of hard-boiled analysis, that instalment selling, properly regulated, is economically sound and both industrially and socially advantageous, the companies to which I refer are nevertheless well aware that the principle is capable of abuse and that eternal vigilance is required on their part to safeguard it. They do not consider it suitable for any and every class of merchandise or service. They are as heartily against the dollar-down-and-dollar-a-week formula as the most conservative old school economist.

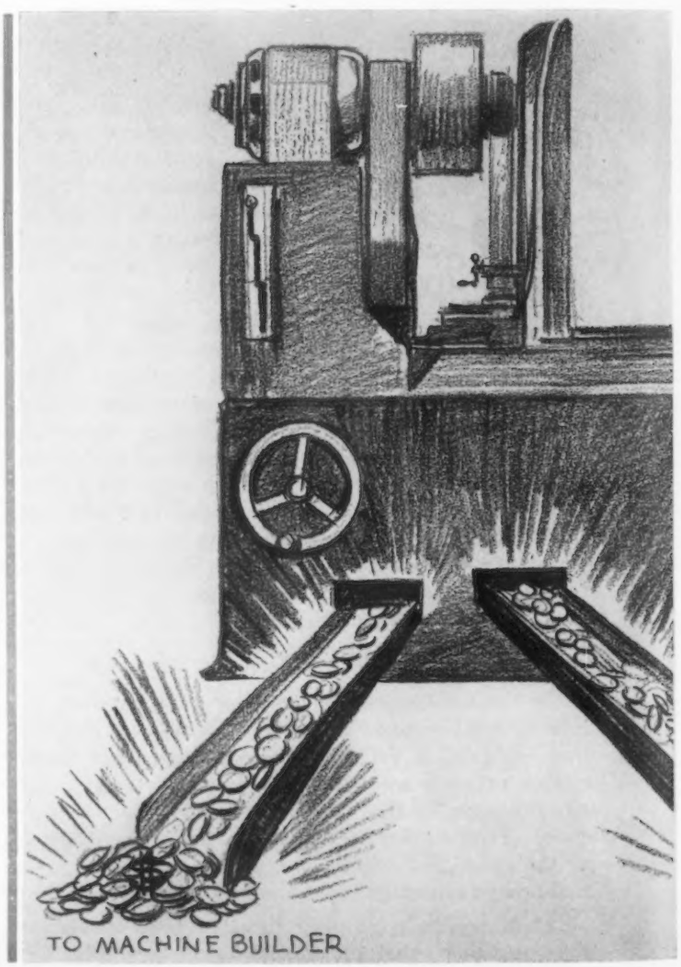
They insist that it shall apply only to goods of relatively high unit value, that the credits shall be carefully selected, that the down payment shall be at all times sufficient to give the buyer a strong incentive for paying out and to protect the seller from substantial loss in the event of an early default, and that the terms of the note shall increase the buyer's equity and decrease the seller's at a rate that insures the complete safety of the average transaction.

The discussion thus far has related to instalment sales of consumer's goods. The large national and international companies whose point of view has been herein expressed have within the past three years discovered an even sounder application of the instalment selling principle, namely, its use in the sale of productive equipment. The consideration of its possibilities in that field is the actual objective of this message.

In many industries, during the period in question, the need for modernization has been heavily stressed but without any notable results so far as inducing widespread purchasing of new machinery and plant equipment is concerned. At this very juncture, when equipment prices are generally lower than for years past and possibly for years to come, there is much being said about the matter but comparatively little done. It appears to be the psychological moment to modernize, with costs low and a business upturn already overdue, but the cash outlay required for the purpose is a stumbling block.

The railroads, under similar circumstances, would be able to float equipment trust notes, payable serially over a brief term of years, whose interest and principal might conceivably be covered in part at least by the increased earnings or the savings effected by the use of the new equipment.

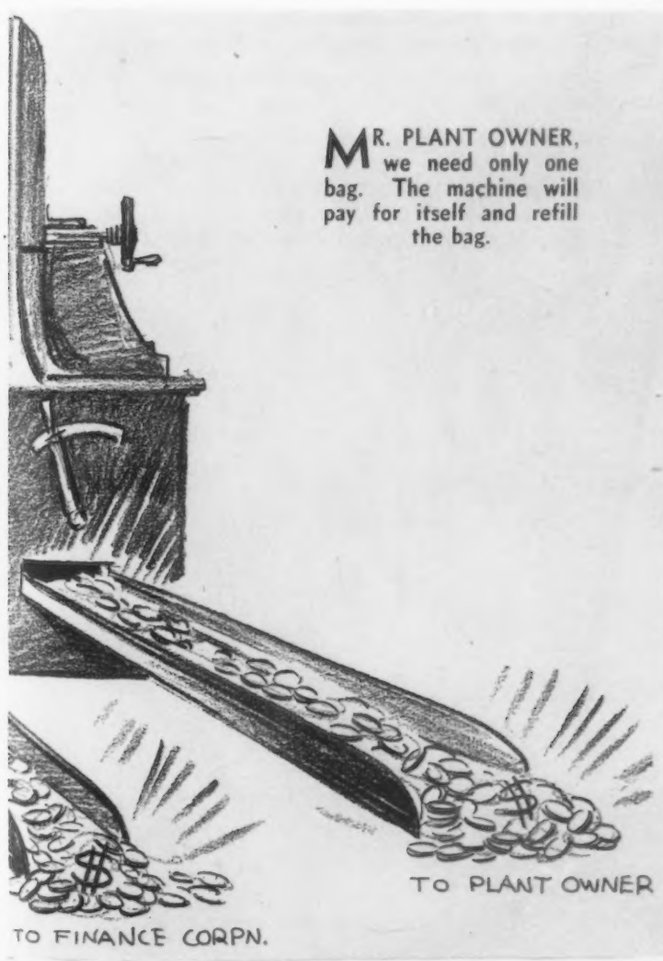
The industrial plant, however, must in general pay



cash for its equipment or give a short term, single payment note. If its banking facilities permit, it can borrow for a definite, limited period at moderate rate of interest, or on call, but with the assurance in the latter case that the loan will be called unless paid within a reasonable time. It may, of course, often be renewed after payment, but somehow the funds must be secured to pay it in full before new equipment has had time to earn or save its cost, and generally the bank would prefer, even if it does not actually require, that the borrower remain with no loan charged against him for a period of 60 to 90 days in every year.

Unless, therefore, the corporation has a cash surplus on hand for the prevention of plant obsolescence, any substantial industrial modernization program is likely to demand recapitalization, and, except for the large manufacturer, may prove to be a sinfully costly expedient.

The instalment principle steps in at this point to provide a credit basis comparable with that used by the railroads. It offers to install the new equipment for a moderate down payment and to accept a serial note for the balance, providing for monthly payments on account, extending over a period of from one to three years, or even more in some cases, though in-



stances are rare in which up-to-the-minute equipment will not defray its own cost within a three-year limit. In no case is the term of the note allowed to exceed the period of active life of the equipment.

Many instances of the sort are on record wherein the economies of the new installation have paid the bill without affecting the corporation's cash position to any marked extent at any period of the transaction. The down payment makes the heaviest demand. After that, if the equipment is in constant use, the serial payments are taken in stride, so to speak, with the profits enough in excess gradually to offset the down payment.

An Obvious Advantage to the Buyer

Obviously this method of buying has great advantages for the industrial plant in need of new equipment but with an insufficient cash reserve to acquire it on the usual terms without much inconvenience. Its desirability from the buyer's standpoint is so apparent that the reluctance of some machinery and plant equipment manufacturers to push instalment terms as a means of stimulating sales can only be due, it would seem, to a prejudice against the principle.

It is not the contention that instalment selling of machinery and plant equipment is the most desirable method in all cases. Buyers with available cash that is not needed for other purposes will do well to pay cash and take their discounts. Buyers able to pay in full within 90 days without inconvenience should do so. Instalment selling as a credit expedient is only preferable when the buyer wants to maintain a comfortable cash position and can only do so by letting

new equipment defray its own cost. But the cases of that kind today among buyers who sorely need to modernize in part or altogether must be very numerous. And the volume of equipment business procurable on that basis which cannot at present be secured on any other terms must be immense.

The fact that one very prominent manufacturer of machinery began, some months ago, to advertise instalment terms would seem to indicate recognition of this probability in at least one important quarter, and it is greatly to be hoped that the precedent thus established will be widely followed.

A possible cause of the equipment manufacturers' reluctance to commit himself in this way has been the impression, apparently rather general, that he must bear the entire credit risk of his instalment transactions. This is not necessarily so unless he carries his own paper, which few manufacturers can do at the present stage without financial discomfort, and which must at any stage be an inconvenience for all but those in the strongest cash position.

Equipment paper discounted with an instalment banking house is not handled on a straight indorsement basis unless the manufacturer prefers it. The usual plan is a limited liability basis, and, in some instances, the notes of strong purchasers have been discounted without recourse when a seller of high responsibility has fully guaranteed his product.

The provisions of such a plan are subjects for negotiation, between the manufacturer and the instalment banker, and in a majority of cases the final details can be shaped up to meet the seller's needs.

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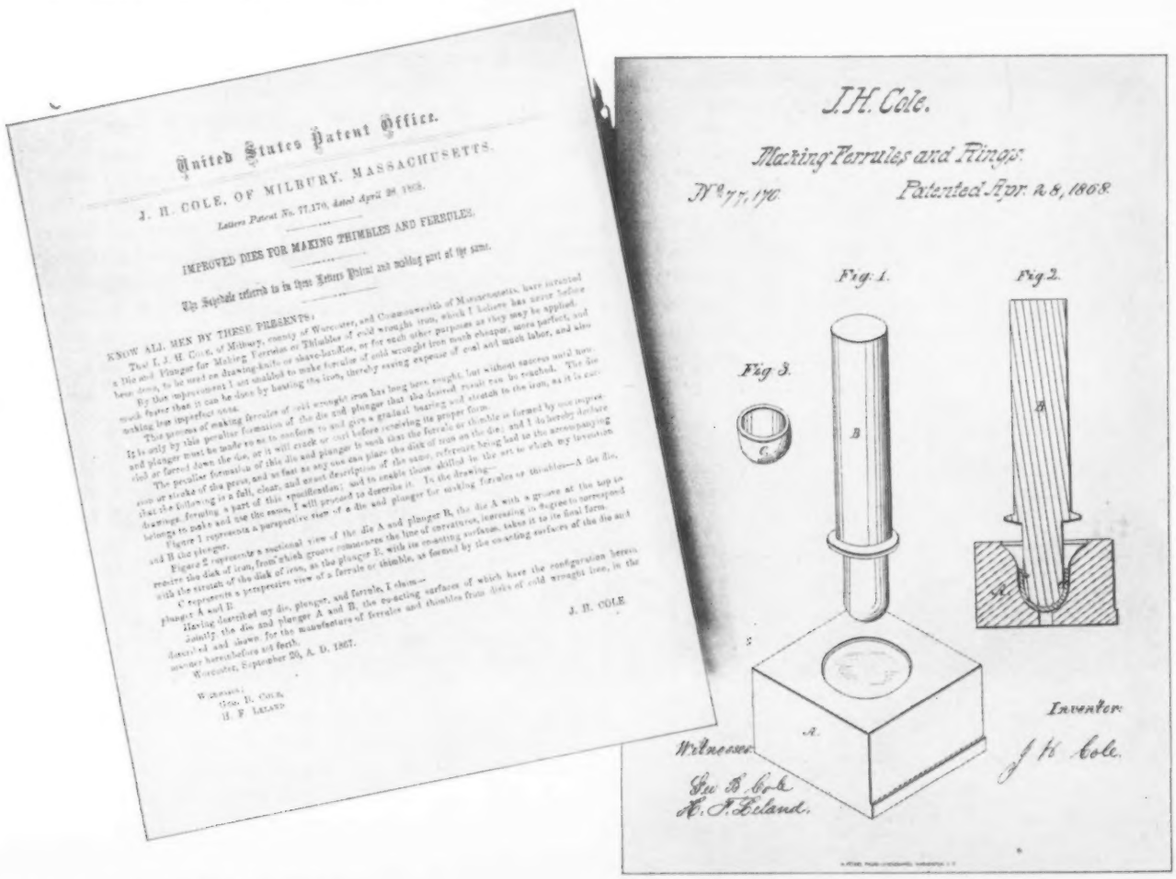
Beginnings of the Pressed Metal Industry in the United States

IN the letters patent here reproduced, issued in 1868 to J. H. Cole, a resident of Milbury, Mass., near Worcester, the pressed metal industry in the United States is believed to have had its beginning.

This patent, it will be seen, covers the invention of a die (A) and plunger (B) for making ferrules or thimbles (C) of cold wrought iron. This improvement, states the patent, enables making the ferrules "much cheaper, more perfect, and much faster than can be done by heating the iron, thereby saving the expense of coal and much labor, and also making less imperfect ones." The peculiar form of the die and plunger was set forth as permitting the ferrule or thimble to be "formed by one impression or stroke of the press, and as fast as anyone can place the disk of iron in the die."

In 1883 the Worcester Ferrule & Mfg. Co. began quantity production under this process and is still operating, its name today being the Worcester Pressed Steel Co.

The patent papers, including later ones, are on exhibit at the John Woodman Higgins Armory of the Worcester Pressed Steel Co., at Worcester, Mass.


United States Patent Office.

J. H. COLE, OF MILBURY, MASSACHUSETTS.

Letters Patent No. 77,170, dated April 28, 1868.

IMPROVED DIES FOR MAKING THIMBLES AND FERRULES.

The Schedule referred to in these Letters Patent and making part of the same.

KNOW ALL MEN BY THESE PRESENTS:

That I, J. H. COLE, of Milbury, county of Worcester, and Commonwealth of Massachusetts, have invented a Die and Plunger for Making Ferrules or Thimbles of cold wrought iron, which I believe has never before been done, to be used on drawing-knife or shave-handles, or for such other purposes as they may be applied.

By this improvement I am enabled to make ferrules of cold wrought iron much cheaper, more perfect, and much faster than it can be done by heating the iron, thereby saving expense of coal and much labor, and also making less imperfect ones.

This process of making ferrules of cold wrought iron has long been sought, but without success until now.

It is only by this peculiar formation of the die and plunger that the thread must be made to so to conform to and give a gradual bearing to the iron, as it is carried down the die, or it will crack or cut before receiving its proper form.

The peculiar formation of this die and plunger is such that the ferrule or thimble is formed by one impression or stroke of the press, and as fast as any one can place the disk of iron on the die, and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to capitals thereon, which belongs to make and use the same, I will proceed to describe it. In the drawing—

Figure 1 represents a perspective view of the die A and plunger B, the die A with a groove at the top to receive the disk of iron, from which groove commences the line of curvature, increasing in degree to correspond with the curvature of the disk of iron, as the plunger B, with its exacting surface, takes it to its final form.

Figure 2 represents a sectional view of the die A and plunger B, the die A with a groove at the top to receive the disk of iron, from which groove commences the line of curvature, increasing in degree to correspond with the curvature of the disk of iron, as the plunger B, with its exacting surface, takes it to its final form.

C represents a perspective view of a ferrule or thimble, as formed by the exacting surfaces of the die and plunger A and B.

Having described my die, plunger, and ferrule, I claim—

J. H. COLE

Jointly the die and plunger A and B, the exacting surfaces of which have the configuration herein described and shown, for the manufacture of ferrules and thimbles from disks of cold wrought iron, in the manner hereinbefore set forth.

Worcester, September 20, A. D. 1867.

Witnesses:
Geo. B. Cole.
H. F. Leland.

J. H. Cole.

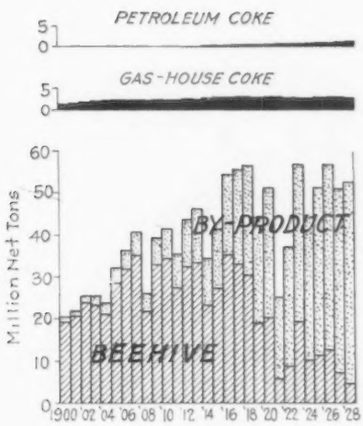
Making Ferrules and Flings.

No. 77,170. Patented Apr. 28, 1868.

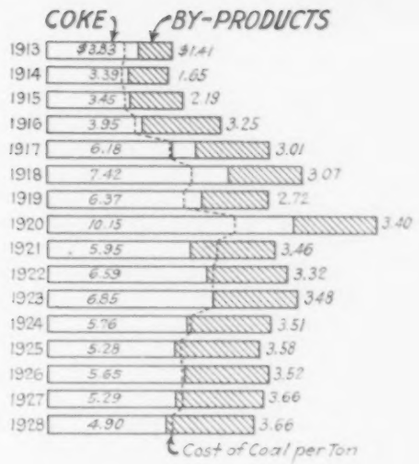
Fig. 1. Fig. 2. Fig. 3.

Inventor: J. H. Cole.

Witnesses: Geo. B. Cole, H. F. Leland.



Production of coke in the United States, 1900 to 1928.



Average value of by-product coke and gross value of by-products and cost of coal for each ton of coke produced.

DEVELOPMENTS IN BY-PRODUCT COKE PRODUCTION*

By A. C. FIELDNER

Chief engineer, experiment stations division, United States Bureau of Mines

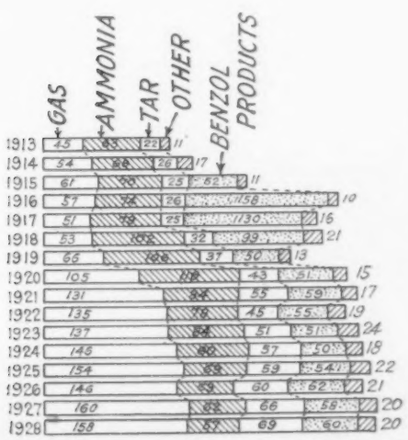
TWENTY years ago a favorite theme of the crusader for fuel conservation was the enormous waste of valuable by-products incurred in the manufacture of blast furnace coke in beehive ovens. In 1910, 83 per cent of the coke production was in beehive ovens, from which surplus gas, tar, light oil and ammonia, aggregating in value (at 1910 prices) $40,000,000 annually, were discharged into the atmosphere.

In 1929, proportions were reversed and 90 per cent of the production was in by-product ovens. The average value of by-products obtained in the production of 1 ton of coke in 1929 was $3.60, compared with $1.16 in 1910, although the value of a ton of coke had increased only from $3.47 to $4.80. Production of by-product coke progressed rather slowly until 1915. War needs suddenly expanded the demand for coke and for the by-products benzol and toluol for the manufacture of explosives.

Except during the depression of 1921, this accelerating rate of production was maintained up to 1929, largely at the expense of beehive plants. The 1929 production of 60,000,000 tons of coke will probably remain a record-breaking figure for several years. The developments which are now in progress in long-distance transmission of natural gas, and in the utilization of volatile petroleum products and refinery gases for augmenting city gas supplies, may

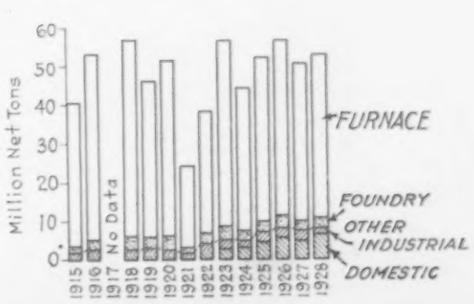
(*Concluded on page* 207)

*Abstract from a paper presented before the American Society of Mechanical Engineers at Chicago, based on United States Bureau of Mines Report of Investigations 3079.



Gross value in cents of the several by-products per ton of by-product coke produced, 1913 to 1928.

By-product and beehive coke sold for furnace, foundry, other industrial and domestic use. Figures for furnace coke include all coke used by producer and not sold.



HOW SHIPBUILDING IS TIED TO THE STEEL INDUSTRY

By H. GERRISH SMITH
Vice-president, Bethlehem Shipbuilding Corpn., New York

THE United States led the world in the use of steam-driven vessels for river, harbor and coastal service. Great Britain led in their general adoption for transoceanic service.

Great Britain was a pioneer in the adoption of iron for ship construction, also. The first iron steamer of record, the Aaron Manby, was built in England in 1820, although the construction of barges and a few small craft for river service had preceded this date by many years.

Notwithstanding the advantages of iron over wood for ship construction, it is a curious fact that its introduction was due to an entirely different reason; an economic one. Great Britain, in the days of wood shipbuilding, was largely dependent upon imported timber for ship construction, most of which came from the United States and Canada. As the supply on the American seaboard decreased, the cost of this material increased and Great Britain saw in the use of iron a freedom from the use of imported material, and that a control over her shipbuilding material at all times could be obtained only by the development of her ample resources of iron and coal.

While the introduction of iron was slow, it was nevertheless persistent. Its use re-established Great Britain, through her merchant marine, in the control of the sea which the United States, with its highly efficient ships of wood and sail, had nearly wrested from her in the 'fifties.

Iron, however, had come to stay, and reluctantly but surely we had to admit it, and ships of iron began to replace our ships of wood. The first iron ships to be built in the United States for ocean service were constructed at the plant of the Harlan & Hollingsworth Co., Wilmington, Del., in 1843 and 1844. These ships were the Ashland, Ocean and Bangor, the largest of which was only 120 ft. in length and of 231 tons.

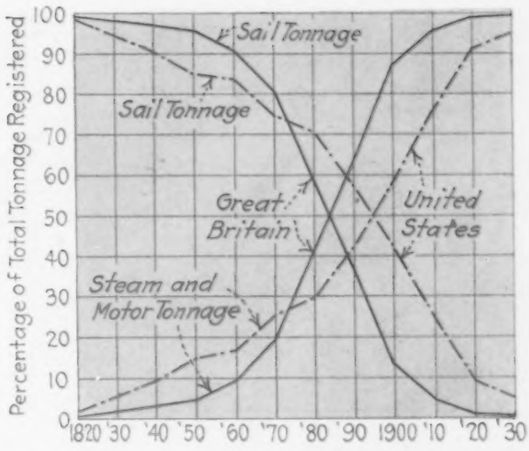
This company was the first in the United States to furnish its plant with the necessary equipment for building both iron hulls and steam machinery, and it continued to hold the lead in iron shipbuilding for 40 years and, until converted to the manufacture of railroad cars in 1927, played an important part in the iron and steel shipbuilding industry of the United States. The two other companies in the United States early engaged in iron shipbuilding were John Roach & Sons, Chester, Pa., and William Cramp's Sons, Philadelphia.

Prior to adoption of the steam engine and iron hulls, the use of iron in ship construction was very limited, being confined to anchors, chains, capstans, hand-operated windlasses, hand pumps and miscellaneous items of equipment.

Steam machinery created a demand for both iron castings and forgings, not only for the propulsive machinery but for auxiliaries and for parts of paddle wheels. The large demand for iron came, of course, with its adoption for hull construction.

Advantages of iron over wood are clearly manifest. It is lighter for the same displacement and strength of a ship; it is less bulky for the same strength and consequently gives greater cubic capacity for the same displacement; it permits better fastening at the joints than wood, and has made possible, therefore, the con-

SOME of the intimate connection between shipbuilding and steel manufacture and exports was brought out in a paper read before the American Iron and Steel Institute in New York. Abstract of that paper is covered here, dealing largely with the history of the transformation from wooden construction, first to iron and then to steel. The economic reasons, as well as those connected with statecraft, which impelled Great Britain to take the step from wood to metal long before the United States did so are brought out. As shown in a diagram, however, both countries today are on about the same basis, of approximately 99 per cent steel and 1 per cent wood.



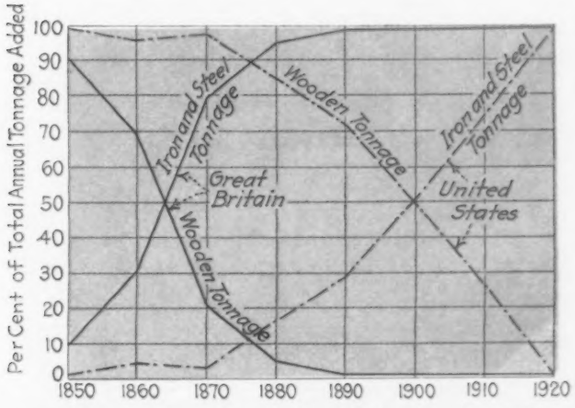
The United States and Great Britain followed closely parallel courses in changing over to mechanical means of driving ships. The United States led in the early days and until some time after the Civil War. Since then Great Britain has had the lead in the proportion of ships driven by power.

struction of ships of greater length and size. Even today the maximum length recognized as suitable for wooden vessels is only 300 ft., which imposes a serious limit as to their size.

Steel Displaces Iron

Hardly had the classification societies established permanent rules for the design, building and inspection of iron vessels when steel appeared on the scene. Its general adoption in place of iron for shipbuilding purposes in the United States took place in the early 'eighties, and was contemporaneous with its adoption abroad. Because of its greater strength it permitted about 20 per cent reduction in the scantlings of ships and resulted in an entire change in the rules of the classification societies. However, the early designs adopting steel for vessels specified iron for the weather deck plating, because of its alleged greater resistance to corrosion.

The first important vessels in the United States to be built of steel were the Atlanta, Boston, Chicago and Dolphin for the United States Navy. Their success led to the general adoption of steel in place of iron for ship construction. Its development up to date has been the use of mild steel, followed by the introduction of workable special steels of greater tensile strength for special use on both naval and merchant vessels.



More than half the ships built in Great Britain, as early as 1864, were of metal, while more than half the tonnage built in the United States continued to be of wood until just before the break of the century.

In the construction of the German passenger ship Bremen about 800 tons weight was saved by using high-tensile steel of about 30 per cent greater strength than mild steel.

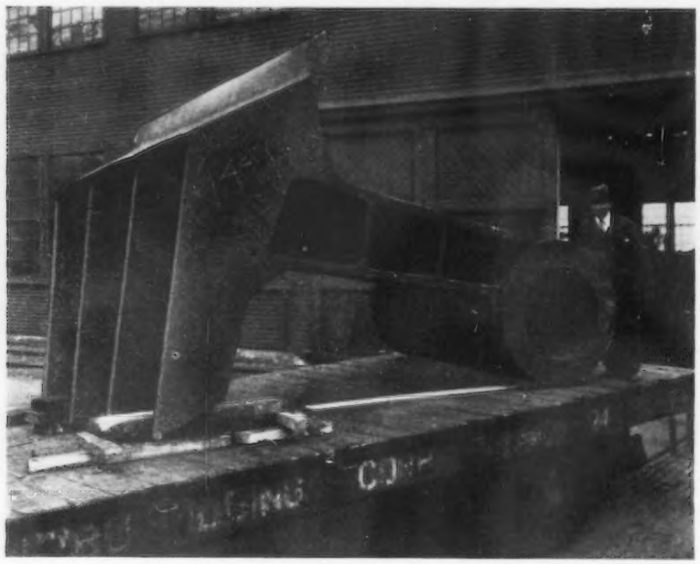
It is a long step from the small vessels of wood and sail of 300 years ago to the first vessels of steel and steam in the 'eighties, but not nearly so great an advance as that which has taken place in the past 50 years, made possible by the great developments in the iron and steel industry.

Mass Production Out of the Question

In form, both lengthwise and athwartship, a ship is of a continually changing curvature, with very little duplication in the size or shape of the many parts of which it is constructed. Hence it is not susceptible to the duplication of parts that is possible in the construction of bridges or buildings. Furthermore, as the weight of a ship with all it carries can only be equal to the weight of water it displaces, the weight of ship structure and all its machinery and equipment must be kept as low as possible, so that its carrying capacity may be as great as possible. This imposes upon the ship designer the most rigid observance of the weight involved in each of its features.

While a large percentage of the outside plating which covers the frames of a ship has considerable shape both lengthwise and transverse requiring heavy machinery to shape it, there are many plates which must be furnaced, hammered into shape and adjusted to fit specially made wooden molds or patterns, a task which is very expensive and which exemplifies another of the complicated processes of ship construction. Such a plate is shown among the illustrations.

In addition to shapes and plating, steel castings are required for many purposes. One such is a cast steel spectacle frame. This casting is of irregular shape, as shown, and forms an outboard support for



Cast steel spectacle frame for outboard bearing for the propeller shaft on a large modern ship.

the propeller shaft. It is box-shaped at the end for connection to the hull of the ship, and when secured has to be machined in place, so that the bearing for the propeller shaft may be in line with other bearings fitted inside the ship.

Material Fabricated on the Job

It is customary for the shipbuilder to fabricate the steel within the shipyard. There is no advantage in fabricating it at the steel mills unless there is a considerable duplication of parts, making possible the use of spacing tables, multiple punches and special devices for riveting. Because of the large number of ships of the same type built during the war, fabrication at the steel mills was then in some cases helpful. But in normal times there is no such duplication of ships, with the occasional exception of barges, and the work can, therefore, be done quite as economically, if not more so, at the shipyard than elsewhere.

It is the specialized character of shipbuilding and the rare duplication of vessels of the same design that make it impossible to build ships in the United States as cheaply as abroad, where the labor rates are less than half of those in this country. That part of the work which is performed within the shipyard is directly controlled by the labor cost, as the only means of lowering the cost of construction are equally applicable in both the foreign and domestic shipyards.

The construction record of ships built or building at a large American shipyard during the past eight years shows why quantity production is impossible. Fifty-five ships were built or are now building; they are of 25 different types and there is even some difference in vessels of the same type.

The total fleet of United States seagoing merchant vessels now on the seas is less than 1400. The average life of a ship is 20 years, so that the entire shipbuilding demand over this period, for large-size ships, is about 1400 ships of many types. As compared with automobiles, this is a lesser number than is turned out by some motor companies in one day, which further emphasizes the impossibility of quantity production in shipbuilding.

Only 40 per cent or less of the money involved in constructing a ship is expended within the shipyard and that is practically all for labor. On the average, about 50 per cent is expended by the shipbuilder for the purchase of the materials and equipment used by him in constructing the ship, while the remaining percentage is expended for taxes, insurance, transportation and other miscellaneous items.

Analysis shows that not less than 200 industries are directly concerned in furnishing the materials and equipment that enter into the construction of a vessel, such as that typified, and it is undoubtedly true that, directly or indirectly, almost every known industry is involved.

A recapitulation shows that 33.1 per cent of the material cost is for products almost wholly of steel or iron, and 23.2 per cent for materials largely of steel or iron. A conservative estimate of the money value of steel and iron products in a typical vessel is 40 per cent of the total material cost or 20 per cent of the total ship cost.

Connection between Ships and Exports

It is the history of all nations that shipping and trade are very closely associated, and that those nations which have owned and operated their own vessels

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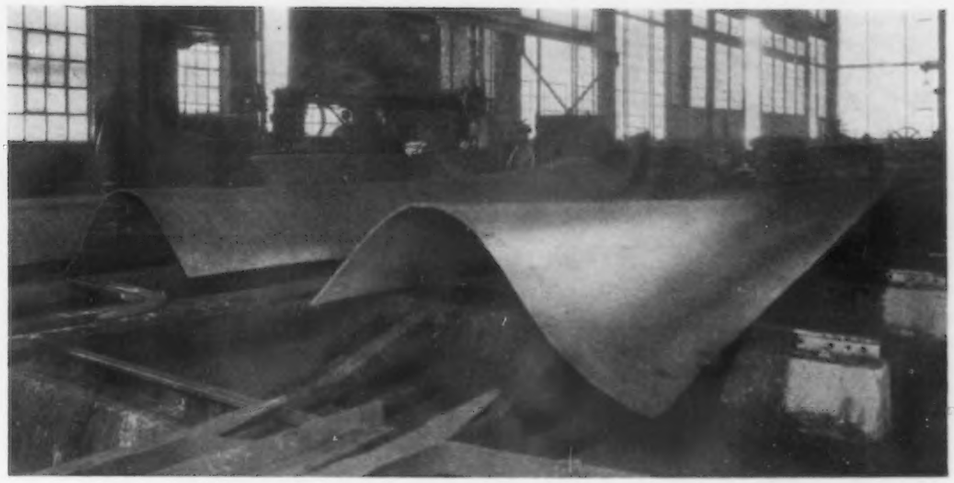
INCREASE IN IRON AND STEEL PRODUCTS EXPORTED FROM THE UNITED STATES DURING RECENT YEARS

(Values in Thousands of Dollars)

	Average 1910-14	Average 1922-26	1925	1926	1927	1928	1929
Electrical machinery and apparatus	21,094	68,183	74,584	85,358	86,150	90,780	121,357
Agricultural machinery and implements	34,455	59,959	77,565	85,500	90,747	116,651	140,801
Industrial and other machinery	103,523	191,185	216,672	230,143	260,796	291,676	350,580
Total machinery	159,072	319,327	368,821	401,001	437,693	499,107	612,738
Automobiles and parts and accessories	23,362	224,450	318,386	320,179	388,528	500,177	539,298
Iron and steel mill products	88,866	154,371	144,101	174,101	160,547	179,649	200,144
Combined total	271,300	698,148	831,308	895,281	986,768	1,178,933	1,352,180
Ratio, using 1910-'14 as unity	1.00	2.58	3.06	3.30	3.64	4.34	4.98



TYPICAL furnaced plates for a modern passenger vessel, showing the irregularity of contour, and bringing out clearly the practical impossibility of standardized or mass production.

in the trade routes to the foreign ports of the world have increased their trade as a result of such operation. The reestablishment of an adequate American merchant marine under our own flag in foreign trade and controlled by our own nationals has been accompanied by an enormous development of this trade, particularly in manufactured and semi-manufactured machinery products.

Some indication of what the growth in this trade means to our iron and steel industry is indicated by the statement of iron and steel and machinery exports given in the table. This shows that for 1929 the total value of these materials, as reported by the Department of Commerce, and which are largely of iron and steel, was $1,352,180,000, or nearly five times what it was in the years immediately preceding the World War, and about double what it averaged for the years 1922 to 1926. It seems fair to assume that these figures represent the trend in the growth of our machinery trade, which has its corresponding effect on the demand upon the iron and steel industries of the United States.

What the Locomotive Has Done in the Past Decade

WHAT the locomotive has done in advancing the progress of our times was told recently at Princeton University by William C. Dickerman, president, American Locomotive Co. The address has been published by the Princeton University Press in a 36-page volume, illustrated by a series of plates.

In the 10 years, 1920 to 1929, railroad trackage increased from 406,580 miles to 428,200 miles. Railroad main lines in the United States in 1927 were 249,131 miles, or more than five times the mileage in Russia, which was in second position, and almost six times that in Canada, in third position. Locomotives in the United States declined from 64,746 to 57,571 between 1920 and 1929. But their aggregate tractive power increased from 2341 million lb. to 2551 millions. The average tractive power went up 23 per cent, from 36,365 lb. to 44,798 lb.

Freight cars declined 2 per cent in number, from 2,322,122 to 2,277,464. Their aggregate capacity, however, went up 7 per cent, from 98,342,700 tons to 105,410,100 tons. Passenger cars declined in number from 53,501 to 52,259, but Pullman cars increased from 7726 to 9529.

Car loading increased from 45,118,500 cars in 1920 to 52,789,800 cars in 1929. Originating freight tonnage increased 6½ per cent, from 1,255,421,000 tons to 1,339,091,000 tons. Ton-miles increased 9 per cent, from 410.3 billions to 447.3 billions. The service of each freight car increased 11 per cent in ton-miles. But the ton-miles of service for the country was less for each individual inhabitant by 4.4 per cent, having declined from 3855 to 3685. Passengers carried declined 37 per cent in number, and 34 per cent in passenger-miles. Each inhabitant on the average was carried 440 miles in 1920, and only 256 miles in 1929, a drop of 42 per cent.

In spite of the considerably greater freight service performed, the number of railroad employees declined 18 per cent, from 2,023,000 to 1,661,000. A further element in efficiency is shown by a reduction of 10 per cent in the amount of coal burned in freight service, with an increase of 8 per cent in the revenue tonnage moved. Average freight train speeds and train loads increased enough so that the ton-miles for each train-hour went up 65 per cent. In passenger service, the Twentieth Century Limited in 1920 used seven steam locomotives between Harmon, N. Y., and Chicago. The average locomotive run was 133 miles. Today two locomotives do the same work, one running 588 miles from Harmon to Cleveland, and the other 341 miles from Cleveland to Chicago.

MOLD-HANDLING METHODS

By WILLIAM L. HARTLEY
Engineer, Foundry Division, Link Belt Co.

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IN all types of foundries certain fundamental factors apply to their problem of mold-handling as regards method, arrangement, and type of equipment. Following is a tabulation of these important fundamentals:

1. *Molding Method and Arrangement of Machines.*—To obtain maximum production from molding machines, patterns, and molding operators, every thought should be given to relieving molders from all duties but making molds. Numerous cases can be cited in repetitive work where relieving the molder even of setting cores has brought about a marked increase in production and lower costs.

2. *Size and Variety of Molds.*—Any means of mold-handling must provide flexibility and be suited to production requirements. Where a wide variety of work must be handled or when a shop is likely to encounter frequent changes in classes of work, flexibility is of major importance.

3. *Quantity of Production.*—Careful planning must guard against too elaborate or expensive equipment for material or tonnage to be handled. Equipment must justify itself from a cost standpoint and tonnage basis, as well as for its operating features.

4. *Setting Cores, Finishing, Drying, and Closing.*—Each of these operations must be given its proper consideration in every mold-handling layout.

5. *Foundry Layout and Available Floor Space.*—Often volume of production can be more than doubled from existing floor space by the addition of mechanical equipment costing less than half of what new buildings would cost. Because of this it is nearly always possible to provide an effective arrangement of mechanical devices for old foundries, with minor building alterations.

6. *Flow of Material.*—Proper relation of pouring zones to melting furnaces, shakeout and delivery of castings to cleaning room, and delivery of cores to molders are of prime importance. To establish the most economical arrangement it is sometimes necessary to make a thorough analysis of comparative handling costs. For example, hot metal can be conveyed in ladles some distance to molds at a lower cost than molds can be conveyed to the hot metal.

7. *Intermittent or Continuous Molding, Pouring, and Shakeout.*—Continuous operations most nearly approach the ultimate in low-cost production. For intermittent operation more careful planning is necessary in estimating cost of equipment and returns on investment, for the cost of proper mold-handling equipment for batch operation will often be more than the cost of continuous conveyors.

8. *Handling Jackets, Weight Shifting, and Clamping.*—These operations in their proper order, with provision for reclaiming and convenient storage of the parts, are most essential. On jobs handling molds on gravity rolls where it was possible to standardize flask sizes, weights are suspended above and are placed on the molds merely by shifting a lever, thus saving time and labor.

9. *Storage of Molds and Proper Cooling Time.*—Even balance between mold production and melting capacity is essential to avoid waste; yet excess mold storage, beyond that necessary for flexibility, is a waste. With regard to capacity of continuous mold conveyors, 25 per cent over the estimated mold production, to take care of peak periods and equalize for missed trays, has proved a conservative basis for figuring.

The pouring operation deserves attention as to handling of metal and method of pouring, and particularly as to the size of molds and length of time

MOLD-HANDLING represents between 20 and 40 per cent of all of the material handling effort in connection with foundry production. As foundrymen have become more mechanically minded, this phase of mechanization has received increasing attention and development.

In this article, based upon the author's paper presented at the recent semi-annual meeting of the American Society of Mechanical Engineers, Mr. Hartley reviews present-day continuous and intermittent mold-handling practice.

necessary to pour. Proper length of cooling time deserves very careful study, particularly in the continuous gray-iron and malleable foundries.

10. *Method and Arrangement of Shakeout.*—Effort should be made to reduce manual labor at the shakeout. A marked improvement in mold-handling and shakeout arrangement has been made on several continuous snap-mold units where simple and effective devices have been developed that automatically dump the mold at the shakeout without manual control.

11. *Flask and Bottom-Board Return.*—The importance of this item should not be overlooked, particularly where high-speed production of molds is to be considered. This feature accounted for a difference in production of 15 molds per hour on a green-sand mold made on jolt-squeeze machines.

Mold-Handling Method in Semi-Continuous Foundries

Under this classification come practically all steel foundries, non-ferrous (with a few exceptions), and small production gray-iron and malleable foundries.

Manual.—Where the molder carries out the molds he makes or has a helper to do this work. It is difficult to establish hard and fast rules that will show at just what point in production volume the carry-out method becomes uneconomical. However, for molds weighing up to 250 lb., it can be stated that mechanical mold-handling equipment will be well justified where a production of 3000 or more molds per day is involved. For heavier work, mechanical devices become a necessity.

Crank, Jib, or Hoist.—Operated manually, electrically, or by air; where the crane operator takes the mold from the closing station and places it on the floor, or where the jib and hoist assist the molder or helper in the carrying out; also, where a number of molds are placed on a long frame or skids, being taken from the molding station by the crane. When a single crane is depended upon to serve a number of molding stations, frequently delays occur that penalize operations.

Skids and Trucks.—Electric or gasoline. Where the molds are loaded on skids by the molders, with a lift truck for moving the skids to the pouring zone, and then to the shakeout station, returning the skids and flasks to the molders.

Gravity Roll Conveyor.—Where the molder places the molds on gravity roll lines, which conveys them by gravity or hand power to the pouring zone, then

The suspended trolley-type mold conveyor was an early development that is still in extensive use.

to the cooling zone, and then to the shakeout station. Empty flasks and bottom boards are returned to the molder on a second run of conveyor. In some cases air cylinders have been used to push the molds along the conveyor, particularly for large flasks on production jobs, such as bathtubs, truck side frames, etc.

Many effective layouts handling molds on roller conveyor are so arranged as to concentrate the pouring in comparatively small areas and to deliver the poured molds to a central shakeout point.

The roller conveyor must provide a minimum of friction under the most adverse conditions. As the greater amount of molding is done in green sands, and demands are being made for closer specifications and finer detail, mold-carrying conveyors must operate smoothly, avoid destructive vibration, and be continuously maintained in this condition. Development of roller-conveyor equipment specifically for foundry use has now reached a stage where any green-sand mold that will stand pouring can be rolled safely.

Mold-carrying systems using floor gravity-roll conveyors have the advantage of flexibility, selective directional movement to suit the day's work, and provide an easy means of access to a central shakeout point. They may be fitted to premises of peculiar shape and may be operated either longitudinally or latitudinally, or both, with molding points arranged in line for economy in sand-handling and other equipment.

Such systems may be altered easily in arrangement from time to time to suit changing conditions.

Much has been written of the advantage that continuous molding and continuous pouring offer over intermittent operation, and there is no longer any question that continuous operation does bring about startling economies. There are many foundries today operating on a continuous basis that considered the idea impossible and foolhardy a few years ago.

Mold-Handling Methods in Continuous-Process Foundries

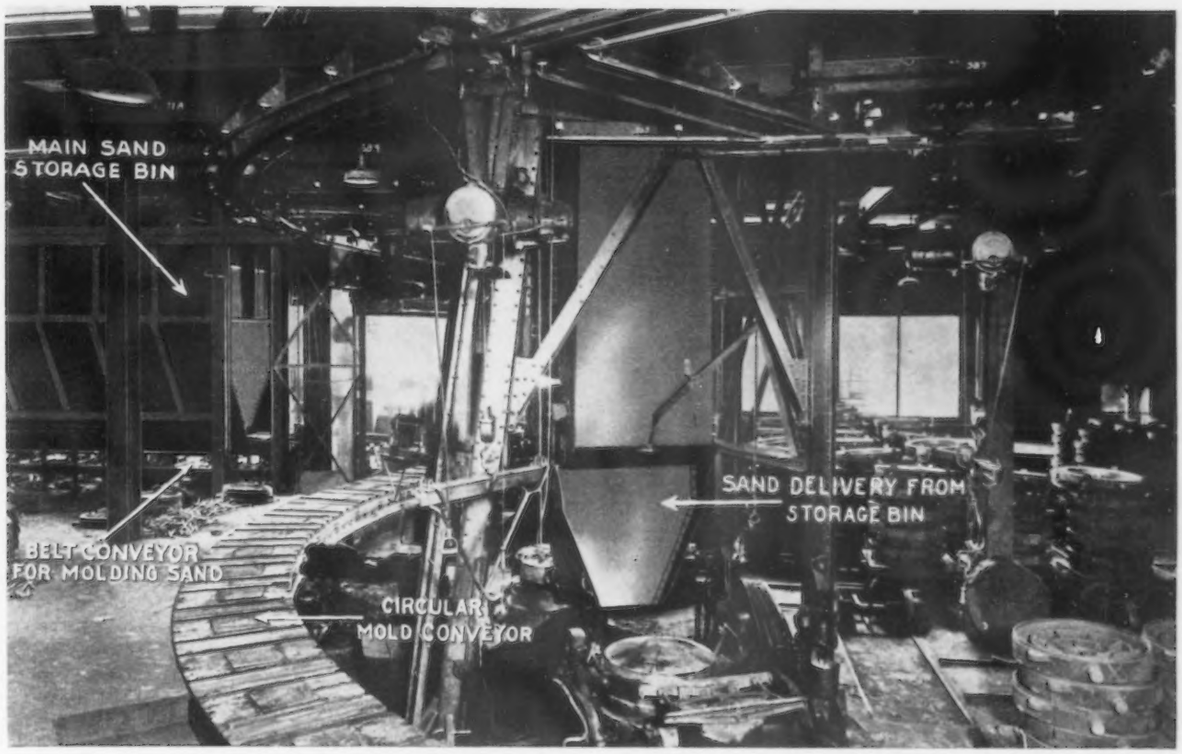
The most general application of continuous-power type mold conveyors has been in gray-iron and malleable foundries. As it is necessary to have a sand-handling system in conjunction with the mold conveyors to get their full benefit, it is almost impossible to give the exact savings chargeable to the mold conveyors alone. Therefore, the following items cover the combined advantages of sand and mold-handling devices, and apply most generally to continuous gray-iron and malleable foundries:

Continuous operation results in a steady flow of materials and products. Continuous inspection is made possible, thereby reducing losses. It is possible to work two or three shifts during rush periods, on original investment. High-speed production lowers inventories of work in process.

Value of floor space is multiplied in accordance with increase in production, and thereby a saving is realized by lower taxes, insurance, maintenance and depreciation of buildings per ton of castings produced.

A reduction of at least 75 per cent in flask equipment is generally obtained on a continuous system as compared with the old floor method; at the same time production of molds is increased. In one foundry producing cylinder molds on a continuous basis, a production of 1200 molds a day was obtained with 100 flasks, the one set of flasks going through the

THE slide-type mold conveyor is now the most widely used of all of the different designs. The illustration pictures the pouring zone of a slide-type conveyor at the foundry of the American Seating Co. ▲ ▲ ▲



▲▲▲ CARWHEEL molds are handled at the American Car & Foundry Co.'s, Madison, Ill., plant on this circular mold table, which is coordinated with the sand-handling and reclaiming apparatus.

operation of molding, pouring, and shaking out 12 times a day.

Conveying molds directly from the molding machine eliminates walking and bending, thus relieving the molders of their most laborious task. There is less danger of damage to molds in placing them on a mold conveyor than when the molders carry out and set them on the floor. The molder's time previously used for pouring and shakeout is used for molding, with no loss of time waiting for iron.

Continuous pouring requires the minimum number of men working the entire day on the pouring gang, as it does away with the extra labor required when a large tonnage of metal is poured in a comparatively short time. It is generally possible to locate the pouring zone of the conveyors adjacent to or near the melting furnaces, thereby obtaining the shortest possible carry. Pouring at one central point simplifies pouring equipment, supervision, and metal control.

After pouring, molds are cooled on the conveyor and delivered to a central shakeout point, thus eliminating collecting and carrying the castings around the foundry area. Likewise the shakeout sand is delivered to one point for rehandling.

Early Design and Development of Continuous Power Mold Conveyors

Continuous operation tends to speed up production and set a pace that can be maintained, because of the elimination of fatigue and back-breaking operations. With careful design, equipment can be arranged for waist-high operations.

The general design of the first continuous mold conveyor consisted of successive carriages about 2 ft. above the floor, which formed the propelling medium. The molding, pouring, and shakeout operations were performed in much the same manner as at present.

Some years later the pendulum or trolley-type mold conveyor was developed and used quite extensively, and with much success.

An electric motor drive, with the necessary gear reductions and end sprockets, is used most generally on this type of mold conveyor, although a few have been built that are propelled by a wire cable and an air cylinder. The advantage of the trolley type was that the rollers, track, and chain, together with all driving machinery, were overhead and safe from falling sand or hot metal, which resulted in smooth travel and minimum wear, but required rather expensive construction, because of the necessary heavy overhead supporting structure.

Floor-Type Mold Conveyor

Although the trolley-type mold conveyor still remains in favor with some foundry operators, it seems principally because of the impression that the trolley conveyors operate more smoothly than the floor types. However, close observation of the various designs of mold conveyors in operation does not indicate any particular advantage for the trolley conveyors insofar as smooth action is concerned.

In the course of time a heavy, rugged chain was developed that would stand the wear and tear of sand and hot metal and which therefore did not need

(*Concluded on page* 207)

CHEMICAL COMPOSITION AS A BASIS

THE need for revising the nomenclature for grades of steel used in steel foundry practice and the classification of steel by chemical composition were urged at a sectional meeting on steel at the Chicago convention of the American Foundrymen's Association. The subject was discussed in a paper on "Chemical Composition as Employed for Classifying Carbon and Alloy Steels for Castings," by R. A. Bull, director, Electric Steel Founders' Research Group, Chicago.

Major Bull, in introducing the subject, said that lack of proper classification is causing confusion among purchasers and misunderstandings between buyers and sellers. The increasing production of steel differing in chemical composition from that previously largely employed in steel foundries has resulted in conflicting opinions as to where to draw the line between the combination of chemical elements in a typical carbon steel casting and the elements in a casting that should be classified as alloy steel. The varying extent to which each element is employed has led quite naturally to diverging ideas regarding limitations for classifying the steel as of the carbon grade or of an alloy grade.

Objections to the Term "Common"

The author said he had no arbitrary opinion regarding classification and his object in presenting the subject was to prompt an interchange of opinion that might lead to an agreement. While the practice of designating the metal in steel castings as "common" and "special" rather than as "carbon" and "alloy" has points in its favor, it has a disadvantage in that the use of the term "common" creates the impression that the material has been made without much regard for quality.

A factor that he said probably has been the chief cause of misunderstanding in classifying the products of the steel foundry is the rapidly extending use of castings that might be called "very slightly alloyed." The most outstanding example of such a material is the 1.25 per cent manganese steel that has a normal content of other elements. While some foundrymen hold that this should not be classed as an alloy steel, they admit the desirability of distinguishing it from the regular grade of steel and, in the writer's opinion, the present importance of manganese steel gives it a definite place in a proper classification. Also the commercial significance of this steel supplies a reason for its separate identification in order that it may be readily distinguished from austenitic manganese steel.

Three Suggestions Made

The term "alloy steel" for material that is distinguishable from the regular grade should be continued, in the writer's opinion. Also he would designate the simplest grade of steel used for castings as "carbon steel." Perhaps the most logical step in designating the grade that includes 1.25 per cent manganese might be to consider the proportions of the five elements customarily determined in steel as usually used in steel foundries. The author made the following suggestions:

Adoption of chemical limitations for defining that product of the steel foundry which includes common steel castings and which forms the bulk of the steel foundry output.

Adoption of a definition for foundry steel which is slightly alloyed and which lies in an intermediate zone between steel of the customary chemical composition and steel that has chemical constituents that permit its classification without confusion.

An agreement differentiating steels for castings universally recognized as of the alloy grade but which are not now classified as high alloy steel.

Two Grades for Carbon Steel Castings

A division of carbon steel castings into two grades was suggested. One would be a regular carbon grade with a carbon content of not less than 0.22 per cent or not over 0.35 per cent; a manganese content of not less than 0.50 per cent and not over 0.90 per cent; a silicon content of not less than 0.20 per cent or more than 0.70 per cent; a phosphorus content of not more than 0.05 per cent; a sulphur content of not more than 0.06 per cent and containing no other elements in appreciable proportion.

The special carbon grade would include castings containing four of the elements designated above, with the carbon less than 0.22 per cent and over 0.35 per cent carbon (when over 0.35 per cent carbon, low enough to give the metal the essential qualities of steel). Should the above classification be adopted, there would be classified as alloy grades steel containing less than 0.50 per cent and more than 0.90 per cent manganese; less than 0.20 per cent and more than 0.70 per cent silicon; more than 0.05 per cent phosphorus and more than 0.06 per cent sulphur or an appreciable proportion of any element other than the five enumerated.

The writer also proposed that a designation of "simple alloy steel" should be given to material con-

FOR CLASSIFYING STEEL CASTINGS

REVISION of nomenclature for steel castings is declared a necessity because of the large variety of compositions now produced. Three suggestions are made by Major R. A. Bull:

Adoption of chemical limitations for common steel castings, for the slightly alloyed types, and for the high-alloy grades.

Some such plan is urged to remove existing confusion.

taining no more than the five ordinary elements, but aside from carbon containing either less or more than the suggested range, but not exceeding 3 per cent. A designation of "low" or "regular alloy steel" might be given to material containing an appreciable proportion of some element other than the five ordinary elements, provided the nickel does not exceed 5 per cent and the amount of any other element does not exceed 3 per cent. As "high-alloy steel" there might be classed material containing more than 5 per cent of nickel and more than 3 per cent of any other element. Under the plan proposed there would be established five grades designated as "regular carbon," "special carbon," "simple alloy," "low or regular alloy" and "high-alloy steel."

Discussions

NEED of classifying alloy steel according to chemical composition was urged by A. W. Gregg, Bonney-Floyd Co., Columbus, in a letter read by Major Bull. If chromium, nickel or other elements are added to improve the properties of the steel it should be designated as an alloy, he said. He suggested that 1.25 per cent manganese steel be put in a "special carbon" class.

A plan of classifying steel by its chemical analysis is limited in its accomplishments, declared J. J. Kanter, Crane Co., Chicago. Such a classification, he said, must be of an arbitrary character, although it is a convenient means. One of the most widely used systems of classification is the S. A. E. numbers, which he thought provided as good a system as has appeared. Not much exception can be made to Mr. Bull's plan to establish a regular carbon grade unless possibly the carbon range is too narrow.

The great difficulty of chemical analysis, he said, arises when an attempt is made to define "alloy steel." The terms "low alloy" and "high alloy" are loosely applied and are given different meanings. Major Bull would fix percentage limits as criteria of "simple-alloy," "low-alloy" and "high-alloy steel."

Referring to Major Bull's suggestion of 3 per cent in general as the concentration of an additional element that would place steel in the "high-alloy" class, Mr. Kanter pointed out that while 3 per cent of one element may be sufficient to confer upon steel unique physical properties, it does not produce a marked change in all cases. The number of elements added, as well as their aggregate percentage, must be considered. Some of the elements used in steel, like silicon and aluminum, are atomically light compared with iron. The atomic weights of these elements are approximately one-half those of iron so that if either is alloyed with iron in the concentration of 1 per cent, about twice as many atoms are being added as iron atoms are displaced. Tungsten and molybdenum are heavy compared with iron and, in alloying tungsten with steel, nearly seven times the percentage by weight is required to displace a given number of iron atoms as is required of aluminum. Consequently, the addition of 3 per cent of aluminum will produce relatively greater effect upon the properties than the same percentage of tungsten. Since alloy steels are used for the specific properties they possess, the chemical compositions should be classified according to the effects with which each one can be associated.

A Definition of Low-Alloy Steel

Mr. Kanter suggested as a definition for low-alloy steel, "steel in which the presence of dissolved elements other than carbon alters to a marked degree the iron carbon equilibrium but does not suppress the austenite-ferrite transformation." This definition includes all the comparatively low-priced alloy steels, even manganese and silicon steels, because they are uniquely distinguished from carbon steels in heat-treatment responses and resulting physical properties.

Most steels designated as "high-alloy steels" are either unresponsive to heat treating or very abnormal in this respect. "High-alloy steel" therefore might be defined as a steel in which the presence of dissolved elements other than carbon suppresses a well defined austenite-ferrite transformation. Under this definition come 18-8 metals, high-manganese steel, stainless steel containing over 15 per cent of chromium and high-speed steels. Other steels on the border line could be designated as intermediate alloy steels.

While metallurgists think of steel in terms of qualities and properties other than chemical analysis, the

(Concluded on page 207)

STEEL CONSUMPTION IN THE

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IN the German steel industry great importance was formerly attached to exports. The statistics of the German steel industry include not only the distribution of exports among the different countries, but also the needs and consumption powers of these countries for different steel products. The present world crisis has retarded exports, both in quantity and in value. Only finished products maintained in 1930 the amount attained by the steady climb since 1925, as the figures in Table I show:

Table I—Iron and Steel Exports of Germany

	Iron and Steel	Products Made from Iron and Steel
1925	344.3 (82.0)	1,746.8 (416.1)
1927	503.6 (120.0)	1,958.1 (466.4)
1929	673.4 (160.4)	2,816.4 (670.9)
1930	526.8 (125.5)	2,787.5 (664.0)

Figures are in millions of reichmarks, with corresponding millions of dollars shown in parentheses.

Besides the finishing industries, of which the chief is the machine industry, there are other important consumers in Germany, such as the State railroads and building, which influence the home market of the German steel industry.

It would seem that the highly developed association of the German steel industry would permit more rapid classification of the internal market according to consumers than in countries without such associations, such as the United States. That this is not the case may be attributed to the fact that the German associations conduct their foreign business directly, while the local sales are made through the trade. Only since the introduction of the perforated card system has any attempt been made to classify steel consumption according to user groups. This matter will be treated again in this article.

United States Leads in Analyzing Output

Before sketching the attempts which are being started in Germany, a survey will be given of what the United States has accomplished in this regard. The large internal market available to the American industry, and the small fraction (5½ per cent) of the total steel exported, led very soon after the World War to the introduction of steel consumption statistics, such as are shown in the figures. [Diagrams taken from THE IRON AGE of Jan. 1, 1931.]

As the project was commenced as a private enterprise, it is understandable that several years were required before the statistics could include a high percentage of the total sales. The increasing participation of the steel companies shows that the industry recognized the value of these statistics. While, in 1926, only 27 companies or 73 per cent of the capacity participated; in 1927 there were 41 companies, equal to 78 per cent; in 1928, 50 companies, equal to 93.8 per cent; in 1929, 54 companies, equal to 94 per cent; and in 1930, 57 companies, equal to 96 per cent.

For this reason, merely a percentage comparison is possible in the earlier years. Only in 1929 and 1930, when a fairly uniform participation occurred, can direct comparison of actual quantities be made. This is especially valuable in that the percentage decline in various applications of rolled products can be observed in relation to the total consumption.

How the Different Industries Have Fared

In the general decline in total sales in the internal market from 100 per cent in 1929 to 79 per cent in 1930, very different amounts of recession

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Table II—Rolled Steel Consumption of United States

Consuming channel	Total in Thousands of Metric Tons 1930	1929	1930 Total on Basis of 100 for 1929
Railroad			
Car and locomotive building	2,318	1,514.4	65.3
Buildings and bridges	670	497.5	74.3
Permanent way	3,376	2,341.6	69.4
Building construction	3,558	3,319.8	93.3
Reinforced concrete	496	466.1	94.0
Building equipment and accessories	519	526.3	101.4
Automobiles and parts	5,455	4,484.3	82.2
Oil, gas and water works	2,585	2,334.9	90 3
Mining	222	160.9	72.5
Agriculture	1,668	954.2	57.2
Metal containers	1,803	1,697.8	94.1
Shipbuilding	272	291.1	107.0
Boilers and tanks	753	661.4	87.8
Machinery and tools	730	568.1	77.8
Screws, bolts and nuts	691	559.7	81.0
Electrical industry	686	514.0	74.9
Forgings	363	251.5	69.3
Pressed and formed metalware	341	394.8	115.8
Stoves, ovens and furnaces	549	533.5	97.2
Jobbers and warehouses	3,696	3,160.5	85.5
Exports	1,909	1,353.1	70.9
Miscellaneous	4,266	2,604.0	61.0
Total	36,926	29,189.5	79.0

Note: These figures are based upon those given in THE IRON AGE of Jan. 2, 1930, page 10, and of Jan. 1, 1931, page 8. They do not give effect to the distribution to ultimate consuming channels upon which the diagrams are based.

UNITED STATES AND GERMANY

By DR. ALFRED MICHELS
Düsseldorf, Germany

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COMPARISONS of per capita consumption of steel for Germany and the United States were made in a recent German article, which is republished here almost in full. There is a dearth in Germany of the intimate data regarding production of various forms of steel and the industries into which the steel flows. Much of this article is based upon our own showing in the issue of Jan. 1, 1931, and corresponding German data insofar as available.

Of particular interest, perhaps, are Table II, showing the proportionate shrinkage of American tonnage, industry by industry, in 1930, and Table III, showing in parallel columns the German and the American consumption of various forms of steel for a number of years. Only in the item of bars has the German per capita consumption approached closely that of the United States. In two of the six years shown Germany has surpassed the United States in this particular. By contrast it will be noted that American consumption of tin plate per capita is perhaps six times that of Germany.

Translated from *Ruhr und Rhein*, March 6, 1931. Two of the five illustrations in that paper were adapted from the two on pages 8 and 9 of THE IRON AGE, Jan. 1, 1931.

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were experienced among different groups of users. (See Table II.) The greatest recession occurred in agriculture, owing to the worldwide agricultural crisis. Demand dropped off 43 per cent; the bar sales being most seriously affected, the agricultural consumption dropping from 40 to 21 per cent of the total. The direct demand of agriculture for rolled products is relatively insignificant. It dropped from 4.5 to 3.3 per cent reaching only a fraction of the earlier years.

Automobile construction indicated an 18 per cent recession, its fraction of the total sales amounting to 14 per cent in 1927 and to 18 per cent in 1928 and 1929, receding in 1930 to 15.5 per cent.

The building industry, owing to its sensitivity to business conditions, has absorbed the following percentages of the total annual consumption since 1924: 18; 17.5; 19.5; 22; 16.5; 19 per cent. The principal item in reinforced concrete construction is bars, which increased from 87.6 per cent in 1929 to 93 per cent of the total steel consumption in reinforced concrete construction in 1930.

Rail replacements dropped from 3,376,000 tons to 2,342,000 tons, or 31 per cent.

Total consumption is classified further, as the diagrams illustrate. The individual rolling mill products were subdivided according to 22 different applications, which in 1929 and 1930 amounted to the total quantity of rolled steel indicated in Table II. (On account of space, only the total amounts are given; see also THE IRON AGE.)

Benefits Accruing from the Analyses

Investigation of steel applications in different branches of industry is becoming more intensive continually and is of much benefit to commerce. Thus the American Institute of Steel Construction, in investigating the practicability of tall structures, recently determined the steel required per unit area of space covered by steel-frame buildings for public buildings, dwelling houses and open structures, according to the number of stories. (See von Halem, Stahlland Amerika, page 33.) This standard is of great importance not only to architects but also to the steel industry.

Recently the United States census was extended to include the question of the sales of manufactured goods. Thus the statistics formerly derived from the steel industry may be extended in the future to include data on the use of raw, semi-finished and finished products in the production of further products.

While the collection of such commercial statistics was possible prior to the development of the perforated card system, the undertaking would have required an immense amount of work. With the widespread use of perforated cards, the perforation of single cards for the assembling of consumption statistics represents very little additional work. German steel users have been classified as public, agricultural and industrial. The latter is divided into 40 sub-groups, but it is perhaps advisable temporarily to assemble these according to the most important groups, and to allow the system to become

further subdivided in the course of time, similarly to the development of the American system.

The most important factor in the correct evaluation of the perforated cards is the use of the correct index. If registry fails for any reason, the group in question may be located by further inquiry. As the sales of most of the German steel associations are conducted about 50 per cent through the market, the classification of the ultimate users is more difficult than in the United States. Scrupulous care and the understanding support by the personnel of the steel trade will soon eliminate the possible sources of error.

German Consumption Gages Less Responsive

The only information now available for the calculation of consumption statistics in Germany has to do with the use of rolled products. At most these permit only a rough estimate as to the purchasers of individual products. Thus the building trade may be followed by the monthly demand for bars and the State railroad requirements by means of the monthly internal demand for rails.

These statistics of the home consumption of rolled products afford interesting comparisons with the corresponding American data. The actual home consumption in Germany in 1927, which was the year of the highest internal use of rolled products, amounted to 10.5 million tons, as compared with the American figure of 30.5 million tons. While the actual consumption in the United States in 1927 was three times that of Germany, the demand per capita was only 1.55 times that in Germany. Since then, these proportions have shifted toward a less favorable standing for Germany.

The variations in the demand for steel rails in periods of business depression are fairly great. In America, according to THE IRON AGE, 60 lb. per capita was used for construction in 1929; in 1930, only 40 lb., a recession of 33 per cent. In Germany the amount used in 1926 was 42.7 lb.; 1927, 55.2 lb.; 1928, 31.2 lb.; in 1929, 40 lb.; and in 1930, 22.4 lb. The use of different rolled products by the German State railroads in the business year 1929 was as follows: Rails, 378,384 tons; small iron, 169,809 tons; switches, 75,815 tons; iron ties, 188,366 tons; and iron switch cross members, 37,542 tons.

The marked variation in the German railroad consumption is illustrated by the following annual requirements, in tons:

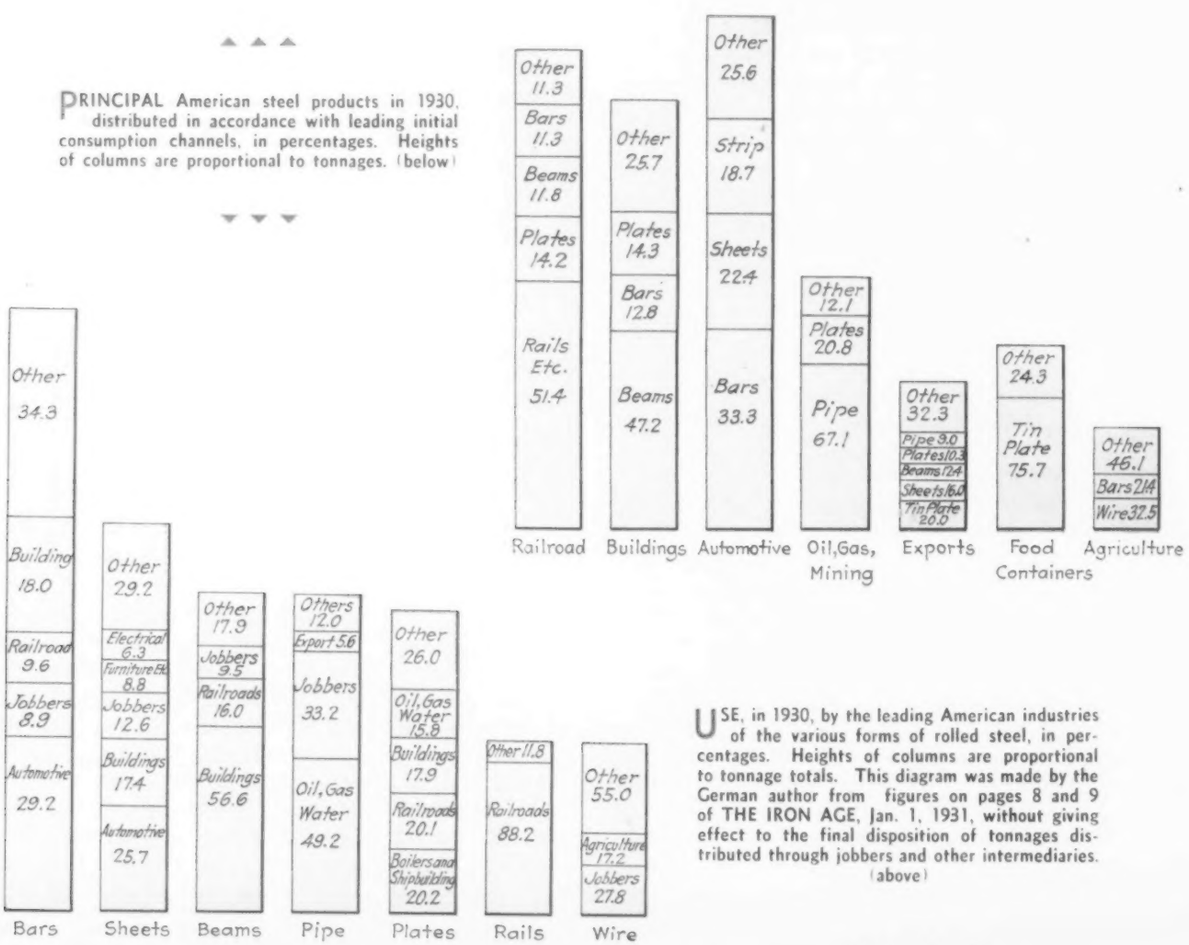
1913	1925	1926	1927	1928	1929
591,800	690,500	962,900	1,014,095	764,761	849,916

The consumption in 1913, according to the old classification, was 664,414 tons.

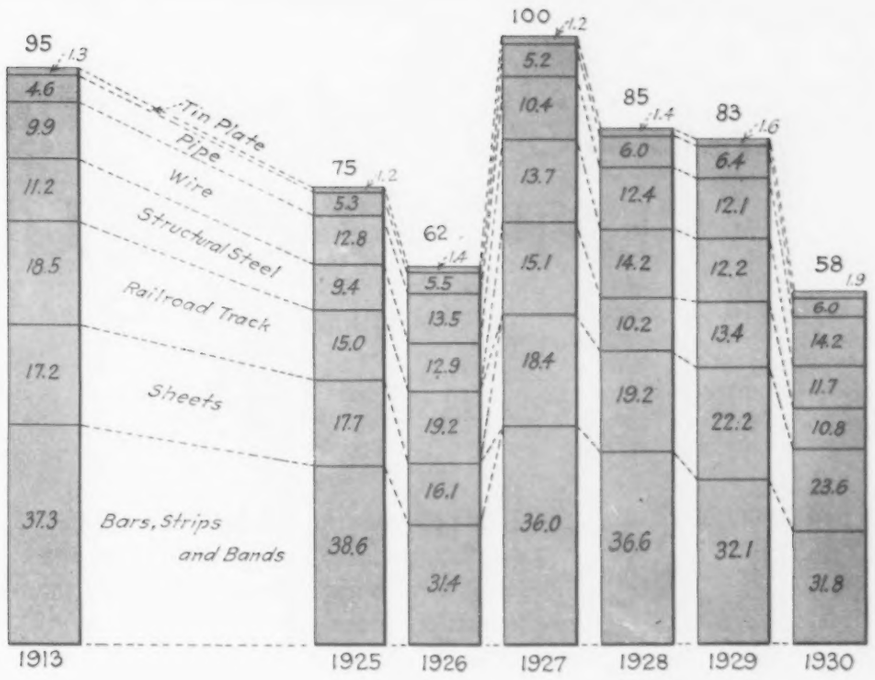
Automobile Demand in Germany Insignificant

Comparison of the demands, of the automobile industry in the two countries illustrates the great importance of that industry as a steel consumer in

PRINCIPAL American steel products in 1930, distributed in accordance with leading initial consumption channels, in percentages. Heights of columns are proportional to tonnages. (below)



USE, in 1930, by the leading American industries of the various forms of rolled steel, in percentages. Heights of columns are proportional to tonnage totals. This diagram was made by the German author from figures on pages 8 and 9 of THE IRON AGE, Jan. 1, 1931, without giving effect to the final disposition of tonnages distributed through jobbers and other intermediaries. (above)



CHIEF rolling mill products used in Germany, in percentages, with column heights proportional to totals and indexes above columns based on 1927 at 100.

the United States and its minor significance in Germany. The development of automobile steel demand in America is reflected by the figures in Table IV.

Table IV—Automotive Consumption of American Steel

	Tons Consumed	Total per Head of Population	
		Kg.	Lb.
1925	4,300,000	37	81.5
1926	3,600,000	31	68
1927	3,500,000	30	66
1928	5,300,000	44	97
1929	5,300,000	44	97
1930	4,500,000	37	81.5

The German automobile industry used, according to the estimate of the German National Association of Automobile Industries, the following amounts:

1928, 186,900 tons or 2.9 kg. (6.4 lb.) per capita
1929, 193,720 tons or 3.0 kg. (6.6 lb.) per capita

In the United States 3.8 million tons was used in steel buildings, while the increasing German consumption has not yet reached a tenth of that amount. The German consumption was

in 1927, 60,000 tons or 0.95 kg. (2.1 lb.) per capita in 1928, 150,000 tons or 2.36 kg. (5.2 lb.) per capita in 1929, 250,000 tons or 3.91 kg. (8.6 lb.) per capita

These figures show that the use of steel in steel-framed buildings has increased four-fold since 1927, and in 1929 exceeded the amount used by the German automobile industry. Since in 1930 about 80 per cent of all the large business and Government building was of the steel-skeleton type, it is to be expected that development of this type of construction will increase the demand for structural shapes at the expense of the bar market.

German Mining and Machinery Steel Looms Large

It may be mentioned incidentally that the following estimates of the steel used in drift construction in the German mining industry show an increasing demand in recent years:

1913	50,000 tons	1927	103,000 tons
1926	70,000 tons	1928	126,000 tons

The consumption of the American mining indus-

(*Concluded on page 208*)

Table III—Domestic Consumption of Rolled Steel Products per Head of Population in Germany and the United States in Kg. (of 2.2 Lb.)

	1913		1926		1927		1928		1929		1930	
	Germ.	U.S.	Germ.	U.S.	Germ.	U.S.	Germ.	U.S.	Germ.	U.S.	Germ.	U.S.
Railroad permanent way	27.1	39.6	19.9	34.8	25.1	29.9	14.2	27.4	18.2	29.2	10.2	(a)
Structural steel	16.5	28.3	13.3	33.5	22.7	32.2	19.8	34.1	16.5	38.7	11.1	(a)
Steel bars	54.7	42.4	28.5	54.2	51.3	48.5	44.1	60.4	37.4	52.7	25.7	(a)
Steel bands and strips	(b)	8.0	4.2	14.9	8.3	15.5	6.8	22.8	6.3	25.4	4.5	(a)
Wire rods	14.5	25.2	14.1	23.5	17.2	23.7	17.3	25.9	16.5	26.0	13.4	(a)
Steel and iron sheets	25.3	45.4	16.7	69.7	30.5	62.8	26.7	71.3	30.1	81.9	22.3	(a)
Tin plate	1.9	8.0	1.4	13.3	2.0	12.3	2.0	13.5	2.2	14.3	1.8	(a)
Tubes and pipe	6.7	21.8	5.7	34.4	8.5	32.3	8.4	32.1	8.7	34.1	5.7	(a)
Total	146.7	218.7	103.8	278.3	165.6	257.2	139.3	287.5	135.9	302.3	94.7	221.8(c)

(a) Not yet separately reported.
(b) Included with steel bars.
(c) Estimated.

PRACTICAL APPLICATIONS OF HEAT IN METALLURGY

By HARRY DOBRIN
Consulting fuel engineer, Pittsburgh.

"LEAVES from the notebook of a consulting engineer" might have been the title of Mr. Dobrin's paper, read before the combustion group of the Association of Iron and Steel Electrical Engineers in Cleveland, on June 17, and here abstracted. He drew from his experience in showing how lost opportunities may be retrieved by utilizing expert advice in applying heat to metallurgical processes. In particular, he made a plea to let the operator know very definitely what he is doing in using fuel, and how the results work out to the advantage of the company.

METALLURGICAL heating has taken a very important rank in recent years as an integral part of the operation of a steel works. The function of heat engineering up to a comparatively short time ago had been carried out by the steam engineering department. The steam engineer has performed a great work in raising the efficiency of boiler plants, and also improving methods of utilizing blast furnace gas.

Efficiencies have been raised to such an extent that, in a modern boiler plant, 80 per cent efficiencies are expected. And some plants have attained efficiencies as high as 83 per cent. Some of these power plants are equipped with the most modern devices the mechanical art has developed.

In contrast to these high efficiencies of the boiler plant, general efficiencies in metallurgical heating hardly average 20 per cent for most reheating processes. This is not merely a surmise. In the sheet and tin mill industries the general efficiencies hardly reach 18 per cent. These figures do not attempt to cover recent modern installations, but they approximate the general state of modernity to be found in the average works, a state which leaves quite a rich field for improving efficiencies in metallurgical heating if results in the power plant are to be approached.

We find, for instance, that in a modern boiler plant flue gas temperatures of 600 deg. F. and below are generally recovered into some additional preheated air. Large sums of money are expended to extract the last few per cent of boiler efficiencies, until we run sharply up against the "law of diminishing returns." On the other hand, in metallurgical heating, flue gas temperatures of 1600 to 1800 deg. F. are treated with indifference, and only here and there are organizations sufficiently alert to harness and utilize this costly waste heat.

There was a definite reason why metallurgical combustion had been neglected in favor of the steam engineering function. In steam engineering, fuel economy, pure and simple, has been the ruling consideration. In metallurgical heating, quality, yield, grain structure and surface have been the ruling considerations, and fuel economy merely a side issue. Those engaged in metallurgical heat treatment know but too well that many a product has resulted in a second instead of a prime, due to over-anxiety for saving fuel.

[Here the speaker took up in detail the prevailing conditions in one department of the steel industry after another. He showed the persistence of old ideas, old methods, old equipment. By contrast, he showed what has been done, in specific cases, by new ideas, methods and equipment. Throughout the story appears the psychological reaction of the operating man—his instinctive disinclination to abandon time-worn methods for those he does not know.]

What Is a Reducing Atmosphere?

In a sheet plant where carrying a highly reducing atmosphere was known to be of great importance and where every means was apparently used so that such an atmosphere be consistently carried, a superficial examination of the gases in the upper half of the furnace and immediately over the top surface of the packs showed what may be called a reducing atmosphere. An atmosphere is mainly judged by its content of unburned carbon monoxide; the analysis showed, in this case, 3.9 per cent of CO and 10 per cent CO_2.

Without a complete analysis of all the gases, no one would have questioned that this was a reducing

atmosphere. But a complete analysis of the gases showed this not to be the case. This furnace was arranged with burners on each side, the packs going through on shafts. There was also a chamber underneath the shafts which had been equipped with burners.

It was discovered that many of the sheets had scratches and pits, and that this invariably occurred on the sheets that had been lying on the top of the shafts. This furnace had seven shafts, and a flue gas analysis was taken under each one. Here is the kind of reducing atmosphere found there:

Bottom Burners On

Shaft	CO_2	O_2	CO
No. 1	10.0	1.0	3.9
No. 2	9.8	1.4	3.2
No. 3	8.8	2.5	2.7
No. 4	10.2	2.2	2.6
No. 5	8.0	4.6	1.6
No. 6	8.4	4.6	1.2
No. 7	7.2	7.2	0.4

This analysis of the gases with the bottom burners on showed a content of free oxygen anywhere from 1 per cent to as high as 7.2 per cent. With the bottom burners off a condition was found which was quite a revelation. Since it was important to have a reducing atmosphere here, imagine the surprise of finding such an analysis as this:

Bottom Burners Off

Shaft	CO_2	O_2	CO
No. 1	4.2	13.0	0.0
No. 2	9.4	5.0	0.0
No. 7	7.6	6.4	0.0

Insertion of a testing tube under the shafts disclosed that there was no reducing atmosphere in this furnace at all. No wonder there were scratches and pits.

The mistake made by many engaged in this work is that they are too prone to judge a reducing atmosphere by sight, or to name an atmosphere as reducing merely by the content of the unburned carbon monoxide. The element, and an important one, which has to be reckoned with is not the extent of the reducing quantity, but *stratification.*

In some cases there may have been a shortage of total air admitted with the burner into the fuel. But if the air has been permitted to run into the furnace unit stratified and unmixed, it will invariably damage the material before it has had a chance to mix with the combustibles in the fuel. The degree of damage varies with the temperature within the furnace.

Letting the Man See What He Is Doing

When dealing with the various steel products turned out in industry, the average laborer or foreman has learned to use the micrometer painstakingly. On tangible things which they can see and touch, heave and pull, they will use a means of measurement to the thousandth or ten-thousandth of an inch. But in dealing with invisible materials, such as gaseous or liquid fuels, they are content to use the rule of thumb. With gas valves it is one entire turn or one-half turn.

Observe an indicating meter showing the flow in volume resulting from the turn or half turn of a valve. In some cases, especially if it is a valve supplying fuel into an open-hearth furnace, that half turn more or less may mean the sending in of an additional 25,000 cu. ft. of gas an hour.

This is one of the reasons why so many organizations have found a great use for an indicating flow meter, where the hand on the indicator shows exactly the amount of fuel being admitted hourly by the turn of the valve. It is hard for the operator to know by the sense of touch how much fuel is going in, but if he can move his valve and watch the indicator, he is admitting fuel into the furnace by the sense of sight. It is remarkable what a fine degree of adjustment can be derived in this way by the operator. Such an indicator has turned out to be a real money saver.

One innovation which has turned out a money saver has been to graduate the dial, not in thousands of cubic feet or gallons, but in dollars and cents an hour. There is something very impressive to the mind of the valve manipulator to know that he is sending in $5 worth of gas an hour by the turn of his wrist, or that he can maintain a proper condition within the furnace by sending in only $3 worth, if the circumstances will permit it.

Discussion on Metallurgical Heat Application

A GOOD measure of the quality of producer gas may be obtained by measuring the gas temperature leaving the producers, according to Martin J. Conway, fuel engineer, Lukens Steel Co., Coatesville, Pa., who, in the absence of the designated chairman, presided at both fuel sessions.

A plea for the recognition of the supreme importance of Quality, Quantity and Economy, in that order, was made by a representative of the American Rolling Mill Co., Ashland, Ky. In striving for this end, accurate records and analyses form very important functions. The speaker told how his company, in gaging its combustion problems, has gone from monthly comparisons to weekly and then to daily reports. This has gone still further recently until every unit (with one exception) in the entire plant now is reporting its performance, in B.t.u. for each ton of output, on each of the three eight-hour turns. This makes it possible to compare crews as well as metallurgical units, and to get the best out of the equipment.

It has been found that quality heating usually leads naturally into the two other items—quantity and economy.

Far Behind the Times

That fuel engineering in general is still operating on the basis of last century's attainments, was the opinion expressed by Feodore F. Foss, Wheeling Steel Corpn. He compared the present groping for results with an old engine which, in his younger engineering days in 1898, he had had occasion to replace in a steel plant in the Ural Mountains, in Rus-

(Concluded on page 208)

THE symbol of mechanization is this father of the master tools of industry. For the engine lathe is the progenitor of all that has given us modern equipment. And father is still going strong!

HOW SILICA AND SILICON AFFECT DIE CASTING MACHINEABILITY

BY G. L. WERLEY AND E. A. ANDERSON
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New Jersey Zinc Co., New York

A DIE casting plant had experienced difficulty in machining certain lots of zinc-base alloy castings. The presence of silica was suspected as a possible cause and an investigation was conducted by the research department of the company.

The results, which are related in some detail in this article, demonstrated that silica is seriously detrimental to the machineability of zinc base castings; that it is not soluble in the alloy investigated, but is not detrimental to the tensile strength, Brinell hardness or impact value. Silicon, on the contrary, has no appreciable effect on machineability.

THROUGH the medium of careful selection of raw materials and rigid control of alloy composition, variability in properties in zinc die casting alloys has largely been eliminated. The present paper, however, deals with a non-metallic impurity—silica—which has an effect on machineability. This has previously not been discussed in the literature and probably is not generally understood.

The problem, samples and facts important in the solution came to us from a die casting plant which had experienced periodic difficulty with rapid dulling of tools on certain lots of castings of the widely used alloy containing 4 per cent aluminum, 3 per cent copper and 0.1 per cent magnesium, balance high-grade zinc, commonly called the "4-3-0.1" alloy.

Chemical analysis and microscopic examination on the samples submitted failed to reveal any unusual departure from metal of satisfactory characteristics other than the presence in the inferior metal of small quantities of silica. Since no silica had been observed in the alloy pigs, a survey was made of the conditions surrounding the actual die casting of the rejected pieces.

It was found that the first lots of castings produced in a new pot and gooseneck almost invariably caused some trouble in machining. This observation suggested that the source of the silica and of the poor machining characteristic lay alike in the core sand adhering to the inside of the pot and gooseneck.

This led to the careful study of the sources and effects of silica in zinc base die castings. Since practically all zinc die casting alloys contain small quantities of silicon, consideration was also given to the effects of this element.

Castings which gave varying degrees of difficulty in machining were analyzed for silica. In one case a casting contained 0.38 per cent of silica and dulled tools so rapidly that it could not be machined. Other castings contained as low as 0.01 per cent of silica and were injurious to the tools only to the extent that the tools required slightly more frequent sharpening.

After preliminary tests in open crucibles had shown that it would be very difficult to mix silica with the "4-3-0.1" alloy, an experiment was conducted in a commercial plunger type die casting machine.

A number of standard A.S.T.M. test pieces were cast from an uncontaminated melt of the alloy. This was followed immediately by another run in which small quantities of silica, in the form of core sand, were placed in the nozzle just before each shot.

The quantity of silica thus entrapped in the castings undoubtedly was variable. Subsequent tests revealed, however, that a sufficient quantity was present in all cases to affect machineability. Analysis of parts of a number of specimens showed the presence of 0.2 per cent of silica.

An attempt to machine the castings yielded immediate and outstanding results. In no case were we able to drill through the ⅛-in. thickness of a flat tensile bar without so dulling the drill that the operation resembled one of punching rather than

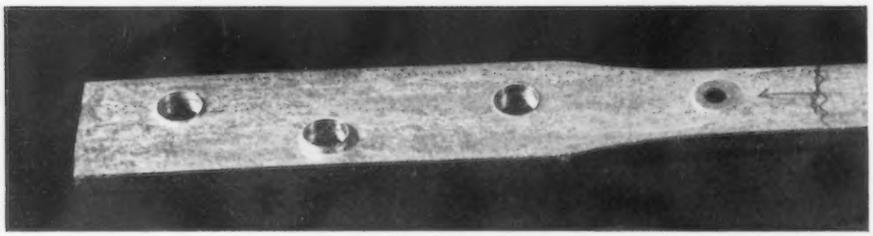
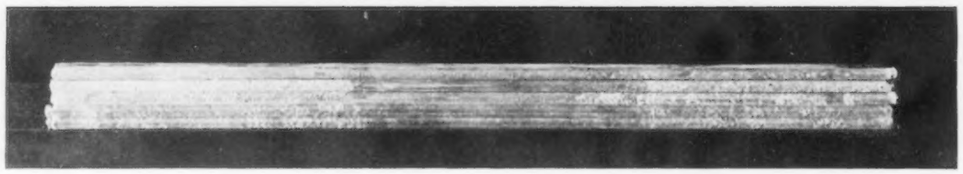


FIG. 1—Effect of silica on the drilling characteristics of the 4-3-0.1 alloy.

FIG. 2—Effect of silica on the milling of the 4-3-0.1 alloy.



drilling. The results are shown in Fig. 1 where the excessive burr on the casting containing silica furnishes ample evidence of the effect on the drill.

The effect of silica on the milling of the alloy was even more spectacular. The specimens shown in Fig. 2 were milled with a newly sharpened cutter. It was impossible to do more than tear the metal away. The cutter was practically ruined in the first few seconds of cutting (Fig. 3).

The machining difficulties encountered on these specimens, deliberately contaminated with silica, were exactly similar to those encountered in the bad cases of commercial castings.

The tensile strength, impact strength and Brinell hardness of the specimens were determined. The results obtained are compiled in Table I. Alloy A contained no silica, alloy B contained 0.2 per cent of silica.

Table I.—Physical Properties of the 4-3-0.1 Alloy with and without Silica

Alloy	Silicon, Per Cent*	Tensile Strength,† Lb. per Sq. In.	Impact Strength Ft.-Lb. ¼ In. x ¼ In. Sect.	Brinell Hardness
A	0.01	50,200	15.5	84
B	0.01	49,800	12.8	89

*This analysis is included here to show that only variations in silica were involved in this experiment.
†Round specimens.

The variations noted may be considered within the limits of ordinary experimental casting procedure. It may fairly be stated that silica has no outstanding effect on the physical properties of the alloy.

It is apparent from the photomicrograph (Fig. 4) that the particles of sand (silica) are fairly large.

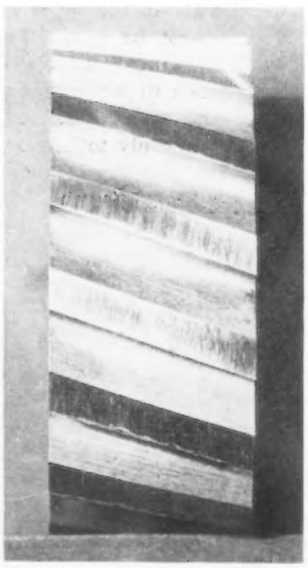


FIG. 3—Effect of silica on the milling cutter.

FIG. 4—Particle of silica in 4-3-0.1 alloy, 100 diameters, unetched.

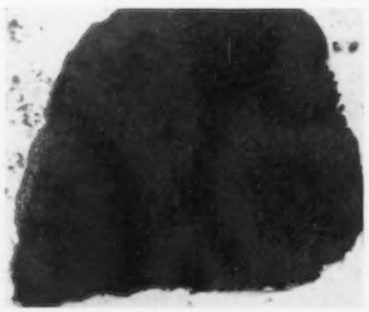
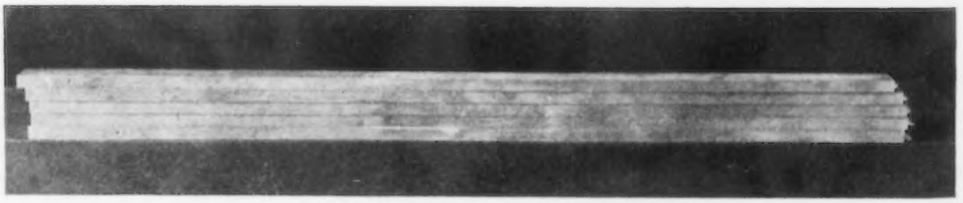


FIG. 5—Milled surface of test bars containing 0.23 per cent silicon.



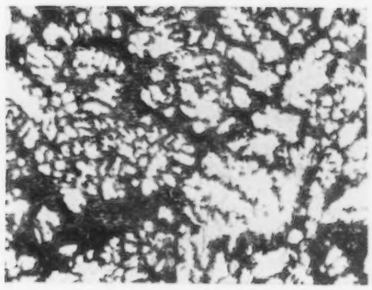
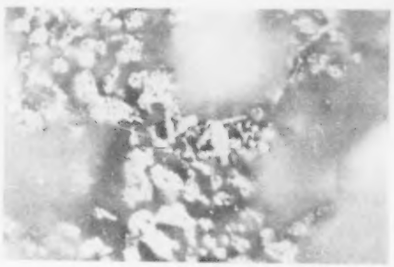


FIG. 6—The 4-3-0.1 alloy plus 0.013 per cent silicon, 100 diameters, etched.

FIG. 7—(Below)—Same as Fig. 6. Only a few small particles of silicon are visible. 1000 diameters, etched.



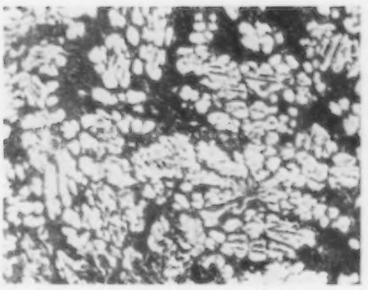


FIG. 8—The 4-3-0.1 alloy plus 0.06 per cent silicon, 100 diameters, etched

As the amount of silica present decreases, the number of particles also decreases, since the size is fixed by the particle size of the core sand. It is apparent, therefore, that the extent to which silica can cause excessive tool wear will vary with the quantity of silica present.

It is obviously very important to know more about the conditions responsible for the introduction of silica in these alloys. In the laboratory tests three melts of alloy were covered respectively with layers of fresh unused core sand, impure used core sand and fine molding sand. The baths were held for 48 hr. at 525 deg. C. and in the first two cases were stirred vigorously at one-half hour intervals during 16 of the total 48 hr.

At the end of the test all of the melts were again stirred to incorporate as much of the solid matter into the melt as possible and were then poured quickly into small open iron molds. This procedure differed from that used in die casting in that the molds were open and the rate of freezing slower, the two factors permitting some separation of the silica particles from the molten alloy.

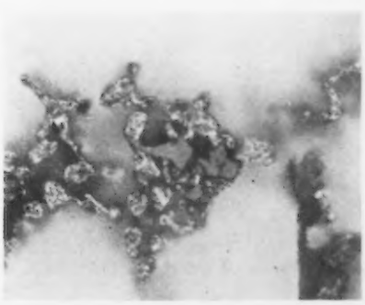
In no case did any of the castings produced in this manner show any machining difficulties and in no case did silica appear in the microstructure or the analysis. It would appear, therefore, that the solubility of silica in the "4-3-0.1" alloy at ordinary metal temperatures (which if existent might result in separation of silica on freezing) is negligible and that the danger of entrapping it in an open melt is remote. It seems that the only danger of entrapping silica occurs when sand particles are present in the gooseneck and are carried by the stream of metal into the die cavity.

Effect of Silicon

The tests just described giye ample evidence that silica entrapped in 4-3-0.1 alloy castings is capable of producing serious machining difficulties. A thorough appreciation of the problem cannot be obtained, however, without giving some consideration to the possible effects of silicon and, even more important, to the possibility of oxidizing silicon to silica in the melt.

In order to study these two factors, a melt was prepared containing 0.71 per cent of silicon. When placed in the die casting machine, the alloy drossed heavily with a reduction of the silicon content to 0.23 per cent in the die cast test specimens. Examination of the skimmings showed the presence of

FIG. 9—Same as Fig. 8. Number of silicon particles is increasing. 1000 diameters, etched.



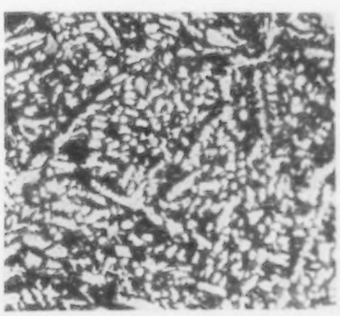


FIG. 10 (Above)—The 4-3-0.1 alloy plus 4.2 per cent silicon. Particles of silicon are quite numerous. 100 diameters, etched.

FIG. 11—Same as Fig. 10. 1000 diameters, etched.

numerous crystals identified as silicon. The silicon remaining in the alloy failed to produce any dulling effect on the tools in a comparatively short test. Smooth surfaces of the type shown in Fig. 5 were readily obtained. This experiment further showed that silicon in the alloy did not affect machineability.

Similar tests carried out on chill castings confirmed this result. As a matter of fact, castings containing as high as 4.2 per cent of silicon were found to machine with great ease.

In Table II are given physical properties determined on random specimens of the alloy as compared with uncontaminated specimens cast just prior to the present test. Alloy C contains a negligible quantity of silicon (about 0.01 per cent), while alloy D contains 0.23 per cent. It will be noted that the strengths of both alloys are lower than those compiled in Table I. This was caused by the use of a different set of casting conditions. The silicon had no apparent effect on the physical properties.

Table II.—Effect of Silicon on the Physical Properties of the 4-3-0.1 Alloy

Alloy	Silicon, Per Cent	Tensile Strength,* Lb. per Sq. In.	Impact Strength Ft.-Lb. ¼ In. x ¼ In. Sect.	Brinell Hardness
C	0.01	47,300	8.0	88
D	0.23	46,400	8.1	83

*Round specimens.

A definite attempt was next made to oxidize silicon to silica by blowing air through a melt for ½ hr. at 525 deg. C. No appreciable effect on the machining qualities was found on castings made in open iron molds after this treatment.

A microscopic study was made to determine the nature of the silicon constituent in the alloy. Under the microscope certain angular, slate gray crystals could be seen which resembled closely the appearance ascribed in the literature to silicon in aluminum.

Photomicrographs, Figs. 6 to 12, furnish evidence that the gray constituent mentioned above is a silicon-rich constituent, possibly existing as uncombined silicon. The etching reagent used was composed of 20 grams of chromic acid with 1.5 grams of anhydrous sodium sulphate in 100 cc. of water.

The silicon particles often were present in interesting forms which are best shown in the unetched condition, as in Figs. 12 and 13.

Conclusions

The writers believe that the following conclusions are warranted by the results presented in this paper:

1. Silica is seriously detrimental to the machining qualities of zinc base die castings.
2. Silica is not soluble in the 4-3-0.1 alloy, floats off rapidly and can be entrapped mechanically only when present in loosely adherent form in the metal passages of the die casting machine.
3. Silica is not detrimental to the tensile strength, Brinell hardness and impact strength of the 4-3-0.1 alloy.
4. Silicon has no appreciable effect on the machineability of zinc alloy die castings.
5. It has not been established that silicon may be oxidized to silica in the alloy.

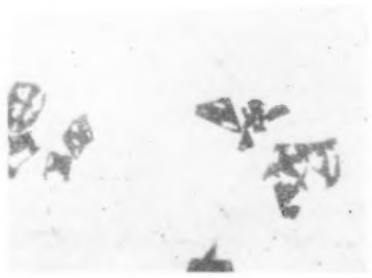
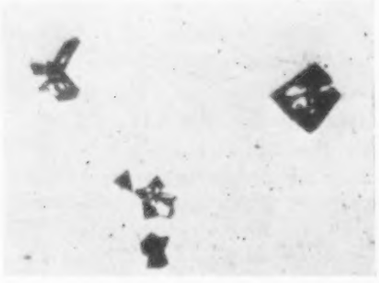


FIG. 12—The 4-3-0.1 alloy plus 0.23 per cent silicon. 500 diameters, unetched.

FIG. 13 (Right)—Another view of Fig. 12. 500 diameters, unetched.



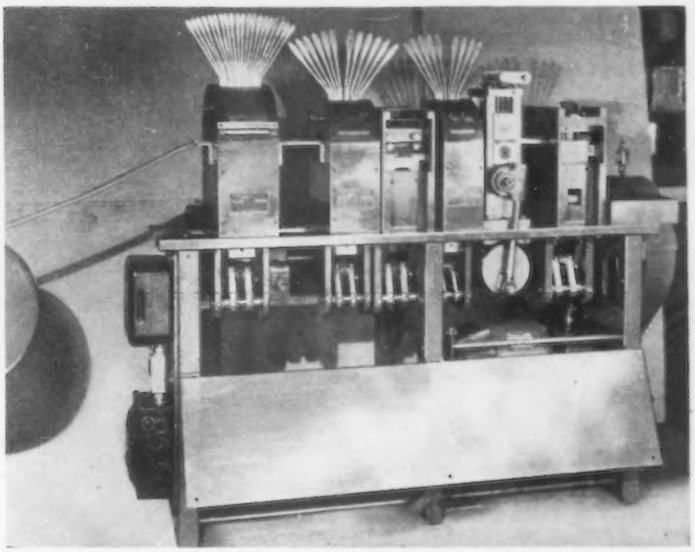
The writers wish to express their appreciation of the assistance rendered by G. Edmunds and E. J. Wilhelm in making the laboratory tests and by J. L. Rodda in the preparation of the photomicrographs.

AN improved method of making sulphur prints, in which the misleading dark spots developed by the action of elements other than sulphur on silver salts are avoided, has been described by H. Van Royen and E. Ammermann (*Stahl und Eisen*, April 9, 1931).

Gelatinized paper (which may be prepared from ordinary silver bromide paper by fixing and washing) is wet with a solution prepared by mixing a 5 per cent by volume aqueous solution of 1.84 sp. gr. sulphuric acid with an equal volume of a solution containing 25 grams of cadmium acetate crystals, dissolved in 200 cc. of 80 per cent acetic acid and diluted to one liter.

After draining, the paper is pressed against the specimen under examination for 2 to 4 min., according to the purity of the steel. After a short wash in water the paper is immersed for 2 to 3 min. in a solution containing 120 grams of copper sulphate crystals, 880 cc. of water, and 120 cc. of 1.84 sulphuric acid. The print is then washed an hour in flowing water and dried. This type of print is unaffected by phosphorus, but even small quantities of sulphur are sufficient to develop the black to dark brown spots of copper sulphide.

Automatic Machine Embosses Eight-Line Name Plates



BLANK zinc tape, 2½ in. wide, from the reel at the left of the machine shown in the accompanying illustration passes through four embossing heads and a piercing and cutting-off unit, emerging at the right as completed name plates bearing the manufacturer's and consignee's names, order number, size, weight and other data that may be changed as required. This machine was built by Pannier Brothers Stamp Co., 207 Sandusky Street, N. S., Pittsburgh.

The first embossing head from the left is provided with 20 engraved wheels for embossing any consignee's name of 20 characters and spaces or less. In the second head there are 12 wheels; the first six for embossing the order number, the others for marking the length and other dimensions. This information appears on the third line of the tag. These embossing wheels are set to bring the characters desired into operation by moving the levers to the proper position as indicated on a scale.

The third head is provided with a single die that embosses the words "Order No." and "Length" in the second line; "Size" in the fourth line; "Pcs." (pieces), "Weight" and "Heat No." in the fifth line; and the manufacturer's name and address in the seventh and eighth lines. The fourth embossing head is provided with nine wheels for placing the required information after the word "Size" in the fourth line.

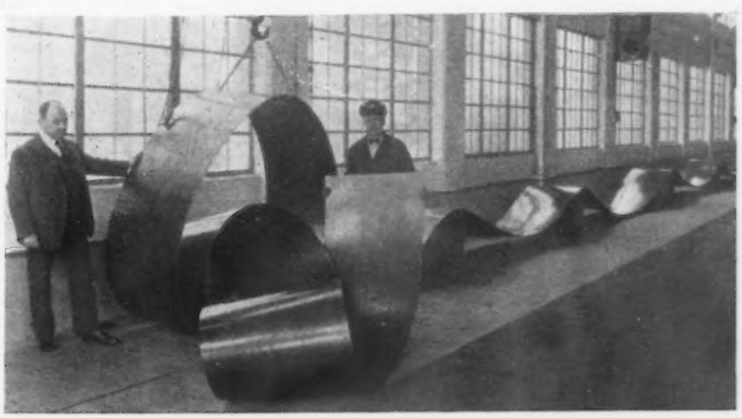
A roller feed device draws the tape through the machine to the cutting and piercing mechanism at the extreme right where the holes are punched and the completed tags cut from the strip. The drive is through a silent chain from a 1-hp. motor. When all the heads are set, the machine will continue to turn out identical tags. The machine illustrated is one of two that are installed in mill offices where the name plates are made as required. Additional information is placed in the sixth line of the tags by means of hand-operated embossing machines located in the shops.

32-In. Cold-Rolled and Hardened Steel Belt

A COLD-ROLLED and hardened steel band 32 in. wide, 360 ft. long and 0.0472 in. thick has been manufactured by the Sandvik Steel Works, Sandviken, Sweden. In the matter of width this achievement is said to represent a world's record in cold-rolling and hardening. These wide steel bands are primarily intended for steel belt conveyors, but are used also for other purposes, such as in the construction of aircraft.

In the course of only a few years the width of steel bands has been increased from 18 in. to 24 in., and now to 32 in. In this connection, the Sandvik works has rolled steel strip measusing only 0.0001182 in. in thickness.

The rolling and auxiliary machinery for finishing 32 in. steel bands includes a cold-rolling mill of a weight of about 200 tons. The bearings in the largest roll alone weigh about 11 tons.



Two-Spindle Buffer with Variable Speeds

A VARIABLE-SPINDLE-SPEED buffer, with a different speed on each of two spindles, is offered by the Black & Decker Mfg. Co., Towson, Md. This independent operation of each buff, and the varying speeds, make for greater versatility of application.

Spindle speeds from 2000 to 3000 r.p.m. are possible, and these selective speeds are obtainable by quick-change pulleys applied to the shaft of motor, located in the base. Each buffing head is driven with two cog belts and either may be stopped at will by means of a clutch, one for each spindle. The spindles have automatic brakes, to stop the buffing head immediately when clutch is disengaged.

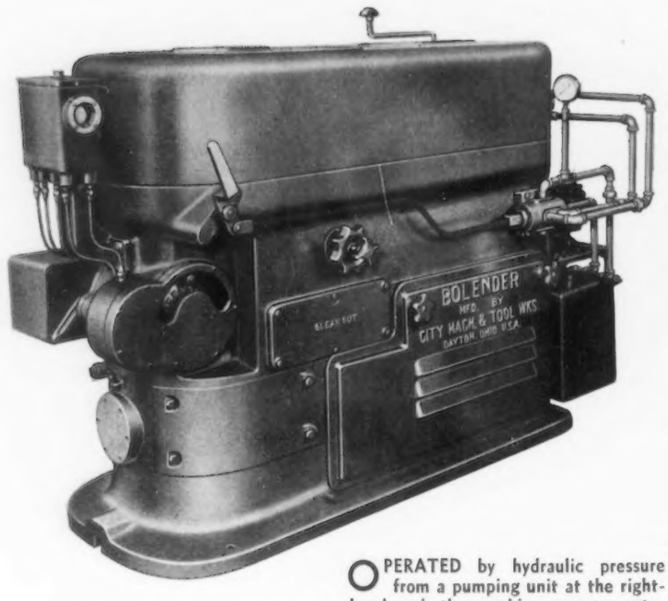
A rugged and heavy one-piece casting forms the base, with three-point contact to insure a perfect bearing on any floor. The motor is extra heavy duty, ball-bearing type, capable of large overload, and insuring capacity for the heaviest work. It is mounted on a removable steel plate in rear of buffer, and is so suspended that, by means of a small hand wheel, proper tension on the "V" belts is maintained by lowering or raising the motor.

Gear Burnisher Equipped for Hydraulic Operation

A HYDRAULICALLY actuated model of the Bolender gear burnisher, designated as the 2-H, has been placed on the market by the City Machine & Tool Works, Dayton, Ohio. The air-operated machine of the same design, the model 2, will continue as a regular product. Smooth cushioning action, increased uniformity of work and speed and economy of operation are advantages of the new machine which is furnished with a hydraulic pressure unit complete with motor, pump, tank and controls.

Operation is automatic; the gear is revolved a definite number of times in one direction and then in the other, after which it stops and may be unloaded. The number of revolutions in each direction may be varied from approximately 3 to 30. Hydraulic burnishing pressure may be varied through a wide range and is indicated on an open-faced dial.

The machine will take gears having a maximum outside diameter of 14 in.; with slight alterations this capacity can be increased to 25 in. Either bronze bearings or roller bearings will be furnished for the mounting of the master burnishers.

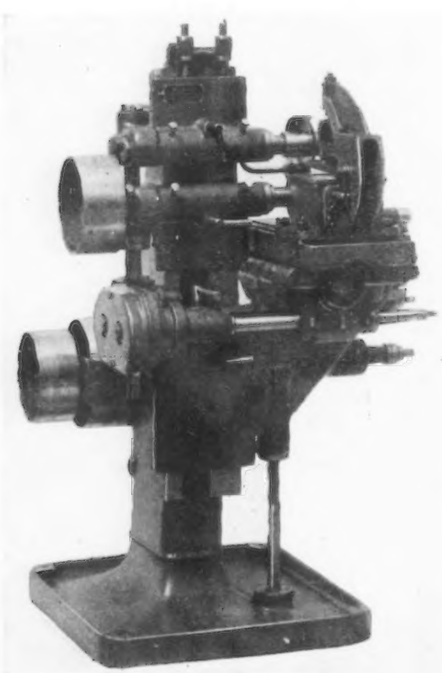


OPERATED by hydraulic pressure from a pumping unit at the right-hand end, the machine reverses automatically and stops when burnishing is completed.

▲ ▲ ▲

Automatic Milling Machine for Rapid Production

ADAPTABILITY for a wide range of fixtures, quick set-up and rapid production are emphasized by the Superior Machine & Engineering Co., 1930 Ferry Park, Detroit, in presenting the double-spindle automatic milling machine here pictured.

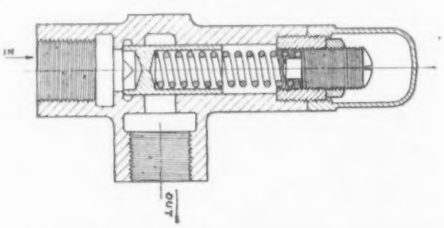


The illustration shows one of the machines equipped with a special fixture for holding piston rings when sawing them apart. The work is clamped and unclamped automatically by the movement of the table. Provision is made for regulating the dwell of the table to permit ample time for the operator to position the work and to remove it when finished. By disengaging the feed, the table and fixture may be operated by hand for convenience in setting up a job. The adjusting screws are provided with graduated dials. A range of table feeds is obtainable through change gears, and a variety of spindle speeds are obtainable through use of different driving pulleys. No countershaft is required, the 4 x 10-in. main driving pulley being driven by belt directly from a lineshaft or a motor.

The hardened and ground spindles are mounted in bronze bearings and run in a bath of oil. All gears are made of steel and hardened. The shafts are mounted in anti-friction bearings. The machine weighs approximately 2000 lb. A single-spindle machine of the same type is obtainable also.

Non-Chattering Piston By-pass Valve

FOR use in connection with machine tool hydraulic mechanisms, ram or press cylinders, oil burners or other equipment where it is desired to maintain a constant pressure, the Fulflo Specialties Co., Blanchester, Ohio, is marketing a pressure relief or by-pass oil valve. The valve is obtainable in sizes for ⅜ and 1¼-in. pipe.

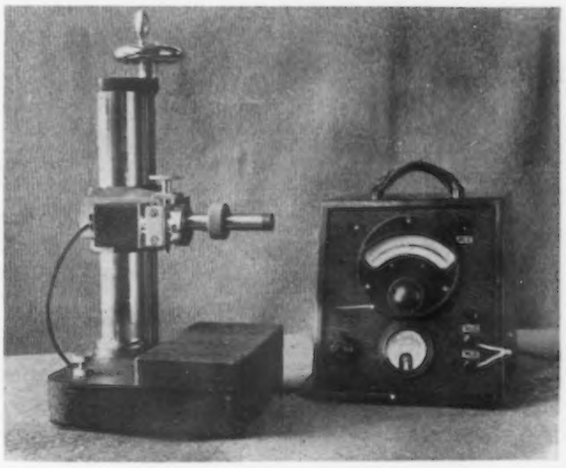


Chattering is prevented by the action of the piston which closes the valve port gradually.

Pounding or chattering is prevented by the cylindrical piston that closes the port before it seats against the body of the valve. Settings for any pressure from 20 to 120 lb. per sq. in. can be made by removing the cap and varying the compression of the piston spring by turning an adjusting screw.

It is claimed that, once installed and set for the desired pressure, the valves require no further attention. Cast-iron bodies and bronze pistons are furnished; valves of all-bronze construction also are offered.

Electric Gage Checks Work Rapidly to Close Limits



THIS electric instrument is adapted for internal or external gaging to precise limits on a quantity production basis.

AN electric gage named the Electrolimit, the electrical parts of which are of General Electric Co. manufacture, is being announced by the Pratt & Whitney Co., Hartford, Conn. This gage, an extremely sensitive and accurate comparator, is available for either external or internal work. Being simple and rapid in operation, it is well adapted for quantity production checking of parts to close limits.

The Electrolimit gage consists essentially of a small gaging head which carries a pointer to contact with the work. Movement of this pointer changes the balance of the electric circuit, so that errors from true size are indicated by a needle traveling over the scale of an indicating instrument. Electrical magnification from 500 to 10,000 is possible, so that the gage may be used for a wide range of limits. The length of scale is 5 in. The Pratt & Whitney company is planning a standard gaging head to be used in conjunction with the General Electric indicating electrical devices. Standardized brackets and fittings will be available for mounting the gaging head for various types of work, so that in the near future the Electrolimit gage will be standardized for a great many different production applications.

Accurate settings can be made quickly, and the gaging operation does not need to be performed by skilled toolmakers. No sense of "feel" is required, as the gaging is done entirely by the variation of an electrical circuit which is transmitted to the pointer in the instrument. The position of the pointer either inside or outside of two limit marks indicates whether the piece will or will not pass inspection.

When used for external work, Hoke precision gage blocks are employed to set the upper and lower limits desired. First the low limit is set up with the proper stack of blocks, and with the latter in position under the diamond contact a simple adjustment is made with a small wrench to bring the pointer to the desired position on the scale. Then the high limit is made up on a second stack of blocks and placed under the diamond contact, and the second position of the pointer noted. From then on pieces of work brought under the diamond contact must allow the needle to remain between the two marks on the dial if the work is to pass inspection.

For internal work two master solid ring gages representing the "go" and "not go" dimensions are needed to set the gage. These rings are slipped in turn over the gage spindle and rotated once. Again the two positions of the needle are noted, one for each ring, and work being inspected must permit the needle to fall within the two marks as before. It is pointed out that this method entirely eliminates "feel," which is necessary in present mechanical gaging of internal work.

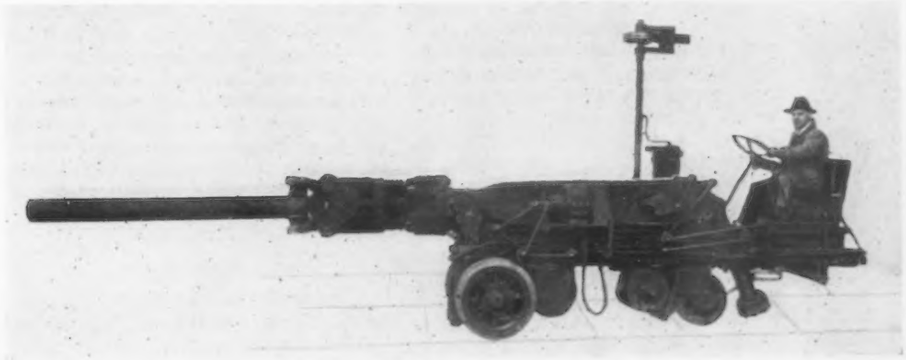
Forging Manipulator Serves Hammer

MANIPULATION of forgings under a steam hammer is the purpose of the "auto floor" manipulator, designed and built by Edgar E. Brosius, Inc., Pittsburgh, which is a modification of the Brosius auto floor charging machine now is use.

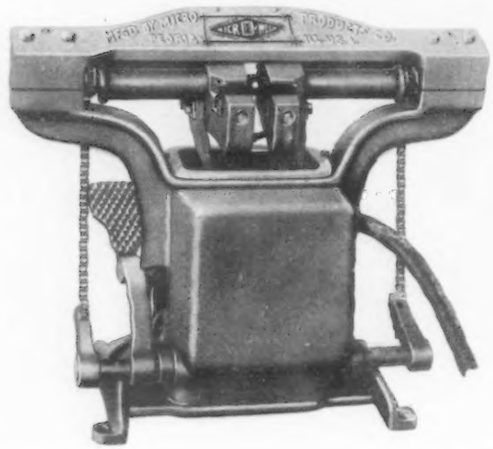
Due to the use of an articulated peel with two sets of shock absorbing springs, no shock from the hammer blow is transmitted to the machine. All shock is taken up in the peel and pieces are manipulated under the hammer with speed and accuracy, doing away with the regular hammer crew.

The machine shown is handling axle blanks weighing 1600 lb., and will easily make as many axles in a day as the hand crew did at their best. The job of operating the manipulator is an easy one and no hand labor is required around the hammer. The unit is self-contained and requires no tracks or overhead runways.

Its movement is not restricted to any definite path, and no provision, aside from a good floor on which to operate, is necessary for its installation. The machine is built also for handling slabs, billets, ingots, etc., between heating furnaces and mill and for serving open-hearth furnaces, electric furnaces, cupolas, etc.



SHOCK-ABSORBING springs take up the effect of the hammer blows in this floor-type manipulator for forgings.



VIEW of butt welder showing work-holding dies for copper rod. The operating pedal and the handle of the six-step heat control are located on the opposite side of the machine.

Special Butt Welder for Copper Rods

FOR butt-welding rods prior to wire drawing, the Micro Products Co., Peoria, Ill., has brought out the model K "Microweld" unit especially designed for copper, aluminum, zinc and other hard-to-weld metals. Operation is by the flash welding process, intended to minimize annealing of the metal at the weld and, by completing the weld in a vacuum, to prevent the occlusion of oxygen.

Four grooves in the welding dies provide capacity for 3/16 to ⅜-in. diameter stocks. When the rods are inserted in the proper groove and the foot pedal depressed, the die shoes grip the work firmly. Additional pressure on the pedal closes the operating switch and brings the dies together until the ends of the rods come in contact, producing the flash. Best results are obtained when the rods are cut by means of bolt cutters that leave a small pinched projection at the ends. These projections are necessary to obtain the proper flash or explosion that creates a vacuum in which the weld is produced without oxidation. A limit switch is provided that may be set to cut off the current at the proper instant, just before the dies come together. Welds made by the machine have a small projecting burr which is removed by filing before the wire is drawn.

The six-step heat control normally is adjusted for the next higher heat with each increase in the size of the stock. There is also a space adjusting knob for regulating the dies to meet special requirements. For normal operation, however, this control need not be touched. The transformer capacity is 50 kw. The machine weighs 500 lb., exclusive of a truck mounting that is furnished when required.

Welding Equipment Uses Oxygen and City Gas

NATURAL or illuminating gas is used with oxygen from a standard cylinder in the Whitcomb gas booster welding and cutting torch here illustrated, a product of the Standard Tool & Mfg. Co., Worcester, Mass. The torch may be used for welding cast iron, bronze, brass or aluminum, for brazing and for cutting steel up to 22 in. thick. When steel more than 8 in. thick is to be cut, two oxygen tanks are used. A special feature claimed is that cast iron welded with this apparatus remains soft and machineable.

The equipment includes a booster or gear pump for raising the pressure of the gas to that required for welding or cutting. This pump is driven by a direct-connected ½-hp. vertical motor. It is submerged in oil, no additional lubrication being required. Adjustment for the proper pressure is made by means of a valve at the gas entrance.

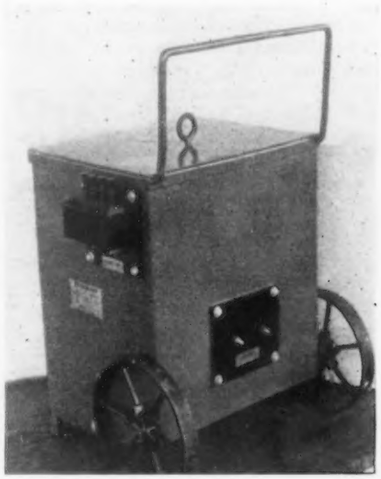
Moisture may be removed from the compression chamber through a petcock at the bottom that assures dry gas coming through the hose to the torch. The apparatus is portable and easy to handle; it weighs about 90 lb.

Arc Welding Set Operates with Alternating Current

AN alternating current arc welding set known as the "FlexArc" has recently been developed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, for welding thin gage material as used in the manufacture of metal furniture, sheet iron cabinets and containers. It is also intended for use by aircraft fabricators, job and garage repairmen and in work that does not justify the installation of a 200-amp. motor-generator type of welder. The operating current ranges from 8.5 to 125 amp.

Either bare or coated electrodes from 1/32 to ⅛ in. in diameter may be used. Many of the ferrous alloy materials commonly welded with reversed-polarity direct current are said to be readily welded by means of the new unit which also has been successfully employed for welding aluminum.

The set comprises a self-cooled transformer, short-wave arc control system and current regulators mounted in a welded steel case. A special high frequency arc stabilizing circuit limits the open-circuit secondary voltage to 73 volts, thereby assuring safety for the operator. Radio interference is prevented by the short-wave arc control system that also makes possible a stable and flexible arc throughout the range of current values. High average power factor and low no-load power requirements are features emphasized as making for operating economy. The absence of moving parts and the totally inclosed construction reduce maintenance costs. The welder is light, compact and easily portable.



Interference with nearby radio receivers is prevented by a short-wave arc control.

Timken Roller Bearing Co. plants will be shut down from July 16 to July 29 for the regular summer vacation.

MORE ABOUT "GETTING BACK TO ARITHMETIC"

Continuation of Comment by Financiers and Industrial Executives Upon the Leading Article in The Iron Age of June 11

I BELIEVE you are quite right that what still is desirable and necessary is that we should all of us in this country seek to get down our costs, and especially those which tend to make human service more effective, and therefore to increase real earnings and wages. I agree with the special emphasis you place on improved machinery and upon the serious possibilities of a neglect of proper depreciation allowance.

The attitude of the banker in all this is as you describe. It is likely that bankers vary, some seeing the light more clearly than others. I should suppose, however, that, where plant improvements are desirable, it would not generally be the bankers who would constitute an obstacle, even though there may be some of them here and there who pay undue regard to technical fluidity.

In the upward and downward curve of the financial cycle, the banker has heretofore tended to preserve a median attitude. He restrains himself from undue excitement in the period of inflation and from undue fear in the period of deflation. His advice in general to his customer is to avoid the extreme up or down that may be just then prevalent and he keeps in mind the constant principles of business undertakings, prominent among which is the necessity of getting costs down, of introducing improved processes and machinery, taking every advantage of the progress of art and invention so as to accomplish the production of more or better merchandise at less cost.

It may, perhaps, be that the recent speculative furore was participated in more than usually by men who happen to be bankers and, if so, such men may have lost measurably a professional equipoise and point of view, but I cannot believe that this is generally the case. If you would advise your manufacturing clientele to consult their banker when they have discovered opportunities for installing new machinery devices, I think it probable that they would find sympathy and understanding on the part of the banker and a full desire to cooperate within those bounds of reason which mark off the area of unsafe finance.

F. L. LIPMAN,
President,
Wells Fargo Bank &
Union Trust Co.

■ ■ ■

THE depression we are suffering from is not entirely traceable to the shortcomings of industry. The inflation of stock market prices over actual values and the resultant losses to innumerable investors have, in my opinion, as much

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FROM the numerous letters commenting on the article, "Let's Go Back to Arithmetic," appearing in these columns June 11, a number were selected for publication in THE IRON AGE of July 2.

The discussion is continued in this issue for the purpose of helpfully revealing the varied viewpoints of thoughtful and experienced men concerning our present-day problems.

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bearing on the proposition as the errors of management in industry. It is quite natural, however, to look to industry to correct a situation only partially of its making because industry employs the greatest number of workers.

Your reasoning, however, is very sound and if industry as a whole would decide to replace obsolete equipment with modern, high-productive equipment, the unemployment situation would soon become less of a menace than it is today.

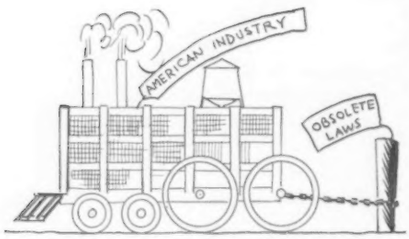
The stabilization of business, desirable as it may be, can never be fully accomplished and therefore it would be well for industry and man to go back to the old practice of saving something for the inevitable rainy day. I believe that much of the difficulty in industry is due to absurdly small profits which do not yield reserves which may be used to good advantage in periods of depression. Likewise labor is not given to preparing for the rainy day, so therefore depression presents problems most difficult of solution.

E. A. MULLER,
President,
King Machine Tool Co.

■ ■ ■

YOUR general suggestion that industries which have not as yet modernized their manufacturing equipment to meet the present state of the art can do so with great benefit to themselves is unquestionably true. It would, in fact, seem to be more a matter of necessity than choice.

However, over and above your



plan for "Financing the Recovery," if we as a nation are to enjoy the prosperity that our ingenuity, resourcefulness and outstanding progress in the arts and sciences deserve, we will have to find some new way to substitute cooperative endeavor for the free and unlimited cut-throat competition which has been developed and which, under existing conditions, is uncontrollable.

If existing laws or their present day interpretation are to prevent a sound and reasonable control of our productivity then, in the interest of the nation as a whole, they should be sufficiently modified to meet the need of the situation as it now exists.

An entirely new world has been created in the past forty years.

GEORGE M. VERITY,
Chairman,
American Rolling Mill Co.

■ ■ ■

I HAVE read with interest the leading article in the current number of THE IRON AGE, together with your foreword, and find it to be a very sensible and helpful article.

In connection with the attempt to place responsibility on the banker not only in your paper but by other people over the country, I want to say with emphasis that I know of no case where any person has been refused a loan to which they were legitimately entitled. The banker is as anxious to promote business as anyone else, and he prospers only as his customer prospers. He has to bear in mind that it is not his own money that he is lending, but that of his depositors and stockholders, and his first and paramount obligation is to keep their money safe.

I do not know any finer exhibition of courage and helpfulness than was shown by the bankers throughout the country beginning with the fall of 1929 when the withdrawal of the money loaned for others assisted in the breakdown of the stock market. The bankers did not want the collateral loans, and as a matter of fact it would have been better for their customers if they had declined to take them, and let them be sold out, but they could not refuse, and rose to the occasion when New York passed out these loans all over the country.

At no time since that has the banker been justified in loaning money to permit customers to buy stocks. Wherever done, it has been no kindness to the customer, who has simply had additional losses.

Today the bankers of America are doing everything in their power to bring back prosperity, and are setting an example of faith in the country. This, however, does not lead them to overlook the seriousness of economic and social conditions throughout the world, but to direct their business with such prudence and skill as they possess.

A. C. ROBINSON,
President,
Peoples-Pittsburgh Trust Co.

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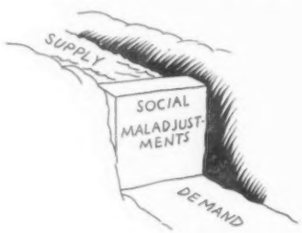
REFERRING to your article, "Let's Go Back to Arithmetic," I have read this over with much interest and think that it is fine as far as it goes but it doesn't go far enough. It seems to me that our present difficulties are not due

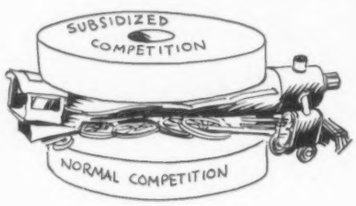


to improper or obsolete mechanization of our industry but rather to the fact that mechanization, even deficient as it is, has got ahead of our understanding of social and economic problems.

I think our civilization is over-engineered and under-organized. Our production capacity is far in advance of the sum total of feasible human aspirations. Our average culture and education are deficient in comparison with the possible supply of things desired by the cultured and educated. While our competent engineers should keep working on the problems in their own particular field, we certainly need a similar talent to take care of the vast deficiencies in our social and political organization. Is it not obvious that, when the supply of both necessaries and luxuries must be dammed up while millions are in want, the prime trouble is not with the mechanics of our civilization but with the fundamental system of the civilization?

In the above I have gone far afield from the subject you brought up for discussion but I couldn't help thinking that the real situation has not been realized by the people in control.

ANGUS S. MacDONALD,
President,
Snead & Co.



YOUR argument for the continued modernization of American industry is most convincing. Where capital is available or can be readily obtained, such a program as you advocate would no doubt lead to long-run profitable results.

Unhappily, a good many industries, including the railroads, are not so situated as to risk, without greater promise than is apparent, investment far in advance of current and understandable needs. Indeed, the railroads continued their investment program longer last year than some of their managers now feel they should have done.

What the railroads need principally is a respite from what they regard as unfair competition subsidized by Government agencies, since this cuts down their gross revenues at the same time that high taxes—maintained in part for the support of their competitors—continue to reduce their net earnings. If the railroads were assured of a square deal from the Government, I feel certain that they would be much more inclined than they are at present to invest additional sums—if the sums necessary could be raised—in the increased modernization of their plants.

The views above do not cover all the points raised by your article, but they represent my views on railway needs, and you are at liberty to quote them as you see fit.

L. A. DOWNS,
President,
Illinois Central System.

NEWS

INDUSTRY'S RESPONSE TO DEBT MORATORIUM

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TO show how sentiment in the metal-working industry has been affected by the international debts moratorium proposal, THE IRON AGE here presents a cross-section of fact and opinion obtained, largely by telegraph, from metal-working plant executives. While it is of course early to expect much actual business springing therefrom, it is significant to note that in some cases there have been definite increases in both inquiries and in orders. Under these circumstances it is not unreasonable to look for a continuance of this impetus, providing the path of international finances is successfully cleared, following the late grave happenings in Germany.

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Lead Buying Received Impetus

STATISTICS show that while the sales of lead were rather above the average during the two weeks' period ending June 20, during the following week ending on June 27 the domestic lead business of the United States was double the average of the two previous weeks, which proves to my mind that the buying of lead received quite an impetus due to the plan suggested by the President on June 20.

IRWIN H. CORNELL,
Vice-president and sales manager, St. Joseph Lead Co., New York.

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Orders and Inquiries Increase

ORDERS and inquiries show a moderate but definite increase. The mental attitude of business generally has swung definitely to one of optimism.

G. W. KELLER,
Vice-president, Brown Instrument Co., Philadelphia

Idle Machines Put to Work

OUR outlook is much improved as indicated by a steady increase in domestic orders resulting, we believe, from the international debt moratorium. Judging by the number of repair orders coming in daily, many heretofore idle machines are being put in operation.

D. A. CURRIE,
Vice-president, Erie Foundry Co., Erie, Pa.

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Returning Confidence Should Stimulate Buying

PRESIDENT HOOVER'S proposal of a debt postponement was a master stroke suggested at a time when it would do the most good. The greatest thing holding back business recovery has been a lack of confidence and therefore hesitancy on the part of industrial firms in making purchases for the future. The moratorium agreement has done more than any other agency to sweep away these fears and to restore confidence. Although recovery is bound to be somewhat slow, nevertheless the return of confidence already in evidence should hasten the day when equipment buying will be resumed on a normal scale.

W. E. BEE,
President, Palmer-Bee Co., Detroit

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Should Stimulate Motor Sales

I THINK President Hoover has taken a most constructive and timely stand on the international debt problem. It has kindled a light that gives hope and renews confidence in the future, which I believe will be reflected in greatly stimulated motor car sales throughout the world.

W. P. CHRYSLER,
Chairman of the Board, Chrysler Corpn., Detroit

Bolt Stocks at a Minimum

OUR industry must of necessity benefit from improved sentiment because in modern times bolt stocks have never been so low as they are at the present moment and any slight increase in business activity must result in heavier buying. It is recognized that psychology influenced by foreign complications is generally responsible for present stagnation and certainly the moratorium should prove to be the initial and most important treatment for the clearing up of our diseased mental state.

H. O. McCULLY,
President, Erie Bolt & Nut Co., Erie, Pa.

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Look for Fall Improvement

WE are fortunate in carrying on at about 50 per cent of normal and from the better feeling found generally look to some improvement beginning in September.

THOMAS W. PANGBORN,
President, Pangborn Corpn., Hagerstown, Md.

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World Business Should Be Stimulated

INASMUCH as our national boundaries are not our economic boundaries, the ills of the nations of the world are inescapably reflected in our domestic business structure. President Hoover's proposal for a debt moratorium without question will exert an ameliorative influence on a disturbing situation. The business of the world should be stimulated by this constructive, statesmanlike action.

W. R. ANGELL,
President, Continental Motors Corpn., Detroit.

New Era for Open Minds

UNQUESTIONABLY the Hoover moratorium plan will have a very significant effect internationally and will play a very important part in the restoration of confidence and general business activity.

While as stated above we believe that business is on the mend, we do not believe it will be generally apparent until the fall months. We are very optimistic as to the new era which we are just entering and believe that the future holds greater possibilites than ever for those businesses which have profited from the last two years experience and entered the new era with new ideas and an open mind.

ROBERT D. BLACK,
Advertising manager, Black & Decker Mfg. Co., Towson, Md.

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Philfuels Above Normal

WE started the year 1931 with a program of expenditures which was slightly above normal compared with previous years. In the expansion of the industrial gas market for Butane, we concluded that we had reached the stage of development where our business would benefit most by maintaining at least normal expenditures, despite the depression, and we have held consistently to that program. Our sale of Butane for industrial gas purposes for the first six months of this year was 215 per cent of the volume in the same period of 1930. With the debt postponement and subsequent return of confidence in industries in general, we expect even better sales results for the last half of the year.

G. G. OBERFELL,
President, Philfuels Co., Detroit

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Believe Firmly in Fall Upturn

WE believe moratorium is timely and will make firmer the upward trend of business which we have felt all along will surely come during the fall months. We believe the deflation is nearly over as it easily balances period of inflation preceding. Believing in the law of economic action and reaction we have not looked for much improvement before fall of this year but have felt certain that it would come by that time. From then on we look forward to steady even though gradual improvement upward through another business cycle.

R. F. INGRAM,
Sales manager, Landis Tool Co., Waynesboro, Pa.

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Bakelite Up in June

OUR business—that of furnishing Bakelite products to primary manufacturers, such as electrical manufacturing companies, automotive manufacturing companies, producers of Bakelite Laminated, etc.—has shown an improvement since June 1 of approximately 10 per cent as against the 30-day period just prior to that, although this cannot be translated into a general trend of larger volume as compared with the first few months of the year. We know of various schemes which augur for increased consumption of Bakelite materials during the next few months. This indication leads us to be very hopeful, since our sales in the past have usually been a fairly good indicator of manufacturing activity in general.

GORDON BROWN,
Assistant manager of sales, Bakelite Corpn., New York

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Will Aid Seasonal Upswing

I BELIEVE that the debt moratorium will have a far-reaching influence not only on European countries, but also on countries in North and South America. The agreement has come at the strategic time to check definitely a further downward trend in industry. On the other hand, it is just far enough in advance of the seasonal upswing in the fall that business a few months hence should be given added impetus. The fact that so many governments could reach so speedily an agreement of world-wide influence should have the effect of heartening business leaders and getting them down to the fundamental problems to be solved in the period of recovery immediately ahead.

N. A. WOODWORTH,
President, Ex-Cell-O Aircraft, & Tool Corpn., Detroit

Increase in Orders

I BELIEVE the international moratorium will favorably affect business in the United States almost immediately. In support of this belief I note an increased volume of orders booked by our company the past week and interpret this as an expression of confidence in the general business outlook. The business of the McAleer company in the first six months of this year including preseason orders was 60 per cent greater than in 1930. This marked gain can be attributed to increased sales and advertising activities. One of the cheering aspects of the present situation is that a number of accounts are becoming active which have been dormant during the last six months.

C. H. McALEER,
President, C. H. McAleer Mfg. Co., Detroit.

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Business on Up-Grade

PRESENT indications are that business with this company is on the up-grade. Sales during June showed a 10.5 per cent increase over May, 1931, and the second quarter of 1931 was considerably better than the first quarter.

It is too early to tell how the month of July will compare with previous months, but orders received to date and active pending negotiations indicate a further increase for July.

One indication of our confidence in the future is the fact that we are now preparing an intensive campaign which is expected greatly to stimulate sales of small water softeners for household use.

W. SPENCER ROBERTSON,
President, Permutit Co., New York.

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Tangible Evidence

I CAN now say that we have some very tangible evidence of improvement in the form of orders and releases that we believe are directly attributable to the better feeling.

H. S. JOHNSON,
Sales manager, Bossert Corpn., Utica. N. Y.

Survey Being Made of Drop Forgings Industry

Designed to furnish a comprehensive view of the production facilities and equipment of the drop forging industry and the extent to which these facilities have been actively employed in supplying the demand, a survey has been begun by the Department of Commerce.

The study is undertaken by the Department of Commerce at the request of the American Drop Forging Institute, which is actively cooperating in the work and defraying a portion of the expense over the expert research services supplied by the department.

The work of the survey will fall into two distinct parts, one dealing with all manufacturers of drop forgings and the other pertaining to those manufacturers who sell all or a substantial part of their total output as rough forgings.

Among the principal objects of the first part of the survey will be to determine the total production capacity of the industry in terms of maximum tonnage, the total annual actual production of rough forgings from 1925 to 1930, and the aggregate investment in drop forging production from 1928 to 1930.

The survey will also aim to show the relative importance of the different types of forgings produced, as automotive, railroad, agricultural machinery, motors and engines, and miscellaneous classifications. A census of equipment will be taken, showing the total count of both hammers and upsetters of various types in use in all plants together with the amount of change in equipment during the period covered by the study.

This program was initiated by the article at page 1918, THE IRON AGE, for June 11, reprints of which were sent out by the Department of Commerce with the questionnaires.

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Remakes Bungalow of Steel Inside and Out

To demonstrate the practical application of its products in the home building field, the Globe Iron Roofing & Corrugating Co., Cincinnati, built a bungalow in which all exposed surfaces, except the hardwood floors, are of steel.

At the very time that the erection of such a structure was contemplated, there stood near the Globe plant a dilapidated frame bungalow, ready to be torn down. It was decided to show concretely what could be done with sheet steel in the case of this building. Removal of the outside wood siding was followed by removal of plaster from the walls. The wood doors, windows and window frames were thrown out. The roof was found to be in perfect condition. It was of sheet steel that had been applied long years before by experienced roofers.

To make the building cool in summer, as well as warm in winter, insulating material in sheets was applied to the walls. Metal window frames were installed and in them steel casement windows. Windows were double-flashed and weather stripped. For outside wall protection steel siding of the appearance of wood siding was applied. Steel door sills and frames and steel doors were installed, giving an exterior of which every exposed surface, doors, windows, siding and roof, was of steel.

So also the interior was made of steel. Sheet metal was applied to walls and beamed ceilings.

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Freight Rate Decisions

WASHINGTON, July 14.—Passing upon complaints by some 60 manufacturers of washers and other small stampings, jobbers and distributers, the Interstate Commerce Commission in a decision of last week held that rates charged on defective iron and steel materials within Official Classification and to contiguous territory were inapplicable as to some products, and that applicable rates were unreasonable in certain cases but not in others. Reasonable rates were prescribed, effective Oct. 5, and reparation awarded for certain shipments. The proceeding involved the question of rates on defective material, numerous kinds of which were included in the shipments. The complainants contended that lower commodity rates under tariff provisions of the Chesapeake & Ohio and the Cleveland, Cincinnati, Chicago & St. Louis (Big Four), equal to the rates on scrap iron and steel billets, were applicable. The railroads urged that fifth class rates were applicable on the defective material and that commodity rates apply only on material known in the trade as wasters. The commission held that on shipments of waster plates, waster sheets and mill warmers, rates provided in the C. & O. and Big Four tariffs, before being cancelled, were applicable. On mill warmers, other than those covered by its first findings; crop ends, and a long list of defective materials, when shipped loose, the commission held rates were unreasonable to the extent they exceeded the billet rates. Rates on other shipments were held not to be unreasonable.

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The Massachusetts Department of Public Utilities has authorized the Boston & Maine Railroad to reduce carload freight rates on various iron, steel and wire articles from or to Worcester and Clinton, Mass., to or from Boston and Watertown, Mass., from 11½c. per 100 lb. to 10c. The reduction is granted so that the railroad may meet motor transportation competition.

Standardization Planned for Foundry Equipment

The organization of a sectional committee on standardization of foundry equipment has just been completed under the procedure of the American Standards Association. E. S. Carman, president of Edwin S. Carman, Inc., Cleveland, is chairman of the committee, and John J. Baum, development engineer, Steel Founders Society of America, New York, is secretary.

The work of the committee has been divided between three subcommittees which will cover the following subjects:

Subcommittee 1—Pattern plates; molding machine parts affecting interchangeability of patterns; flask pins and holes; general dimensions of stock flasks for jobbing work.

Subcommittee 2—Ladle and ladle shank sizes; ladle sleeves, stoppers, and nozzles.

Subcommittee 3—Stock core print sizes, shapes, and finish allowances; pattern markings; rapping plates; fillet sizes; dowel pins for metal patterns and metal core boxes.

The project is under the joint sponsorship of the American Foundrymen's Association and the American Society of Mechanical Engineers.

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Lima, Ohio, Celebrates "Westinghouse Day"

"Westinghouse Day," with A. W. Robertson, chairman of the board of the Westinghouse Electric & Mfg. Co., Pittsburgh, as guest of honor, was celebrated by Lima, Ohio, manufacturers as hosts July 8. A program was carried out at the Shawnee Country Club, Lima, under the auspices of the Lima Industrial Association. There were 100 guests, including a number of executives of the Westinghouse company, presidents and other prominent executives of steel companies and of other companies in the metal-working and other fields and railroad presidents and other executives and heads of banks.

The program included a buffet luncheon, which was followed by various golf events and a dinner. The after-dinner speakers included Mr. Robertson and J. S. Tritle, vice-president and general manager of the Westinghouse company. John E. Galvin, president, Ohio Steel Foundry Co., Lima, had charge of the arrangements. Exhibits of products manufactured by the Westinghouse company were shown in Lima stores and financial institutions in honor of the visit of the Westinghouse officials.

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The fourth annual convention of the Gray Iron Institute will be held at the West Baden Springs Hotel, West Baden Springs, Ind., Oct. 15 and 16.

Bethlehem to Acquire Kalman Steel Co.

E. G. Grace, president of Bethlehem Steel Corpn., has announced that an agreement has been made for the acquisition by Bethlehem of the properties and business of Kalman Steel Co., subject to the approval of the stockholders of the latter. Kalman Steel Co. is a large fabricator and distributer of reinforcing steel, with warehouses in various cities in the East and Middle West.

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Company's "Ads" Posted for Workers to See

In the assumption that the worker is more likely to be interested in his work and to maintain its quality if he knows exactly what claims his firm makes for its products, a publicity plan to keep them so informed is followed at the Bridgeport works of the Consolidated Ashcroft Hancock Co., manufacturer of safety valves, gages and other industrial instruments.

In each department, usually over the time clock, are installed metal slip-cases into which are placed each week full page copies of the company's advertisements appearing in current trade publications. These advertisements, in addition to informing the worker about the claims which are made for the quality of the product, also give him information as to its application and uses; information that he might not get in any other manner.

The advertising done is extensive enough to permit placing a new and different advertisement before the workers each week; thus the material presented is always new and up to date.

At the head of each slip-case is a notice from the management calling the worker's attention to the current advertisement and requesting him to note the uses to which the products are put and the claims which are made for their quality, accuracy and workmanship; also urging him to make good these claims by doing only quality work.

W. I. Newman, employment manager of the company, says that the workers show great interest in the various advertisements and also learn considerable about its products from other than purely factory or manufacturing standpoints.

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Arc Welded Steel House Being Built in Cleveland

Construction was recently started on what is believed to be the first house of complete arc welded steel construction built in America. The residence, which will cost about $25,000, is being erected in the Shaker Heights district of Cleveland. The residence, a two-story structure of French architecture, was designed by George Howard Burrows, Cleveland architect and developer of the welded steel design for residential construction.

There will be approximately 10 tons of steel in the framework. Three-inch, light weight standard Carnegie channels and 6-in., light weight standard Carnegie beams are the principal shapes employed. With one welder and three structural iron workers, approximately four tons of steel were erected during the first day of construction. All steel was cut to size before delivery to the job. It is expected that the entire arc welded steel framework will be completely erected in 2½ working days. Fabrication and erection welding was done on the site, utilizing equipment and electrodes manufactured by the Lincoln Electric Co., Cleveland, by the McKay Building Co., Cleveland.

Mr. Burrows says that the house will cost approximately 40c. a cubic foot and that the use of welded steel construction will cost only $72 more than the traditional type of wood structure.

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Steel Furniture Makers Adopt Business Code

WASHINGTON, July 10.—Trade practice conference rules of the steel office furniture industry were made public July 7 by the Federal Trade Commission. The industry accepted changes suggested by the commission in the wording of the rules.

The commission declined to accept nine group 2 rules. Group 2 rules are those which are accepted as expressions of the trade. Only four of these are included in the code as finally promulgated. They relate to publication of price lists; contracts as business obligations; false invoicing, and distribution of lawful statistics.

The commission approved nine group 1 rules. These rules condemn practices which are illegal. Those adopted relate to price discrimination, secret payment of rebates; giving money to representatives of competitors' customers; inducing breach of contract; enticing employees of competitors; false advertising; shipping on consignment with intent to injure a competitor; defamation of a competitor and selling below cost with the intent of injuring a competitor.

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CATAPULTING AIRCRAFT AT SEA

SOME of the British war craft is being fitted with equipment for the catapulting of airplanes at sea. This picture was taken aboard the Ark Royal.

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Shutdowns of Automobile Plants for Vacations to Occur in Next 30 Days

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DETROIT, July 13.

THE middle of July finds motor car production proceeding at a slow pace, with many plants cleaning up stocks of raw materials and parts preparatory to a shutdown for inventory purposes. It is understood that the Olds Motor Works, and Cadillac Motor Car Co. will close shortly for a two weeks' vacation. The Oakland Motor Car Co. is said to be planning similar action, although the exact dates are not known. It seems assured that other makers, with the exception of those which have recently introduced new models, will follow suit some time during the next 30 days.

What the leading manufacturer will do continues a matter of speculation. Despite reports to the contrary, it is fairly well established that its operations will not be interrupted before the end of the month. At least some suppliers have been given releases of parts and materials on contract for delivery late in the month. It likewise is reported that certain departments may not close, even though others do for the regular inventory period. Although the plant likely will suspend activities for a short time, as it usually does in midsummer, it is becoming increasingly evident that there is no truth in the sensational stories published several months ago to the effect that the company would be shut down for two months.

In keeping with the seasonal downward trend of retail sales, most factories are curtailing assemblies in order to maintain dealers' stocks at a low point. Plymouth, with a production schedule of 17,000 cars this month, is the outstanding exception in the program of contraction. It is expected to equal or exceed all previous records in July, during the period when it is still supplying stocks of new cars to dealers. Incidentally, the new Plymouth has excited more than passing interest and, although it is too early to appraise its public reception, it looks as though the Chrysler organization has put out a winner. The Plymouth people have turned out 2000 flame-colored demonstration cars which have been furnished to distributers and dealers throughout the country. This unusual publicity stunt, coupled with the biggest advertising and merchandising program ever expended by Chrysler, is attracting wide attention. Prices of the Plymouth show little change from the former level and are directly competitive with Ford.

General Motors domestic sales in second quarter were 361,683 cars against production of about 386,000 cars, showing close adjustment of output to retail demand. June sales were 6 per cent ahead of those of the same month of 1930.

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June motor car output in United States and Canada was 254,760 units, estimates National Automobile Chamber of Commerce. This puts first half production at 1,632,971 vehicles, or 29 per cent less than for the corresponding period of last year.

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Free wheeling has been extended to Dodge, DeSoto and Chrysler cars as optional equipment. Fageol is producing all-aluminum six-wheel truck chassis. Detroit is considering agreement by which Ford Motor Co. will pay $12 each for taking over obsolete cars abandoned on city's streets.

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Most Companies Will Show Decline in Production This Month

DESPITE the large gain in Plymouth output this month, it probably will be more than offset by decreased activities on the part of the Dodge, DeSoto and Chrysler divisions, so that the Chrysler Corpn. as a whole will show a decline. Ford and Chevrolet are down somewhat from the June level. Almost all other companies, except Nash and Packard, have had a shrinkage in operations which will be reflected in the July total. There is every reason to believe, therefore, that production this month will not be far above the 200,000 mark, as compared with the 254,760 cars estimated for June by the National Automobile Chamber of Commerce.

How close automobile manufacturers are hewing to the sales line in the matter of production is revealed by the June sales figures for General Motors Corpn. There was an increase of 6 per cent over the same month in 1930 and stocks of new cars were 11,683 units less than they were a year ago. Domestic retail sales in the second quarter amounted to 361,683 cars, against an indicated production by all divisions of about 386,000 cars. This is a falling off of only 2½ per cent, compared with the second quarter of last year, when total sales were 371,139 cars. In view of the curtailment in output by the industry this year contrasted with 1930, these figures reveal the marked improvement in the position of General Motors. It is estimated that total new car stocks throughout the country are not much over 300,000 units, which is a conservative amount measured by the volume carried in previous years. Auburn is a shining example of the industry's conservatism, as its dealers are said to have on hand only about three cars each, despite the fact that in the first six months of 1931 the company produced twice as many units as in the entire year 1930.

Recent report from United States Department of Commerce states that output of motor cars for the first five months of 1931 exceeded the total of new car registrations and export sales by only 1 per cent. This shows how closely the industry is keeping production in line with retail sales.

Free wheeling is being extended to the DeSoto, Dodge and Chrysler cars

as optional equipment at a small extra cost. The type is similar to that used on the Plymouth, being controlled by a button on the dashboard within convenient reach of the driver. It is predicted that still other manufacturers will soon be added to the rapidly growing list of companies adopting free wheeling.

Production of Light Trucks Has Held Up Fairly Well

LIGHT truck production has held up better relatively than passenger car operations, and it is not until this month that a slowing down has become evident. Manufacturers profess encouragement at truck sales, as they indicate that business and industry are beginning to make expenditures again for new equipment. In the heavy-duty truck field it is interesting to note that the Fageol Motors Co. has put on the market an all-aluminum, six-wheel truck chassis which saves 1800 lb. in weight in the construction of the frame, cross-members, rear axle and other parts. The company claims that it has contributed "the greatest advancement in the history of the motor truck industry toward increasing the truck operator's net payload and consequently his net profit."

Automobile Scrapping Plans Progress

THE city of Detroit is reported to be negotiating with the Ford Motor Co. to have the latter take over at $12 a car obsolete automobiles abandoned on the city's streets. These cars, of course, would be taken to the Rouge plant to be disassembled there. Ford is taking advantage of this opportunity to secure more cars to be scrapped under its elaborate scrapping scheme at Dearborn. Ford ships plying the Great Lakes are reported to be carrying new parts from Rouge to branch assembly plants at Chicago, Milwaukee and Buffalo and returning with cargoes of old cars. Heretofore the junking plan has been applied only to a district within a comparatively short range of Detroit, where obsolete units could be transported by trucks to the Rouge plant. It is said to be the Ford company's ambition to increase the scrapping of old cars to 5000 units daily. For the salvaging operations, equipment installed at Rouge includes a 400-ton furnace and a gigantic special machine which crushes old cars, much as scrap is baled, to be charged into the furnace.

Although the Ford plan is the industry's most spectacular achievement in its junking program, the part played by other manufacturers sometimes is not realized. In 1930 it is estimated that some 300,000 cars were scrapped; of that number considerably more than 200,000 were disposed of through General Motors subsidiaries, principally Chevrolet. Just last week a prominent Detroit company subscribed to the junking plan, which has been widened in scope through the efforts of the National Automobile Chamber of Commerce. An allowance is made to dealers, varying from $20 to $40 for scrapped cars, which have the vital parts smashed to make sure that they will not go into service again. In many respects the allowance for scrapped cars is equivalent to an added discount for new car sales or to a bonus to the dealer, as he is credited with $5 or more, depending on the company he is representing, for every new car sold up to a stated maximum.

While there have been many discouraging factors in the endeavor to carry out a comprehensive scrapping program, chief of which has been the tendency of dealers to use the scrapped car allowances for giving bigger trade-in values to prospective customers, the industry is making progress in this difficult task.

CHROMIUM-PLATED spokes are now regular equipment in all wire-wheel models of the Graham line, except the low-priced Prosperity Six. Following so closely upon the introduction of rustless steel snap spokes made by the Budd people, this innovation may be the forerunner of similar action on the part of other companies. This tendency naturally finds its biggest outlet in sport models.

Those who have been predicting radical changes in the products of the Ford Motor Co. perhaps do not realize the extensive alterations which have been made in model A cars recently announced. There is a longer hood, slanting windshield, larger tires, newly-designed bumpers, more deeply crowned fenders, larger hub and rustless steel hub caps, new steering wheel and additional interior appointments. Molding treatment accentuates the streamline appearance of the bodies. Rustless steel head lamps are of the semi-drum type, rounded gently at the rear instead of coming to a blunt point. The top panel of the radiator shell is now given the same color as the body. Viewed from the front, the radiator has only a narrow line of rustless steel around it. All bodies now have a rustless steel cowl strip as standard equipment. Seats can be adjusted by a ratchet catch. A new metal tire cover has been added to the accessory line. This is in two halves, inner and outer, and has two decorative chromium-plated molding strips. Wheels in color are available on many de luxe types at no extra cost and may be had on all models at only $5 extra. Safety glass is put in all windows at additional expense of $15 or $20, depending on the model, and already is standard equipment in the windshield.

GREAT LAKES STEEL CORPN. is about ready to start operating its new 10-in. merchant bar mill. This completes the present construction program of the company, which in little more than a year and a half has spent $25,000,000 in building open-hearth furnaces, blooming mill, hot strip mill and two merchant bar mills at Ecorse, Mich., just below Detroit.

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AROUND THE WORLD IN LESS THAN NINE DAYS!

A NEW record in aerial navigation was achieved when Wiley Post and Harold Gatty, intrepid Oklahomans, arrived at Roosevelt Field, Long Island, July 1, after encircling the globe in 8 days, 15 hr., 51 min. Photograph shows the milling mob that surrounded the plane as it landed at Roosevelt Field.

New Director for Steel Corporation

Sewell L. Avery, president, United States Gypsum Co., Chicago, has been made a director of the United States Steel Corpn., taking the place of the late George F. Baker, Sr. Walter Gifford, president, American Telephone & Telegraph Co., has been elected a member of the finance committee of the corporation. Mr. Avery, who began with the Gypsum company in 1901 and has been president since 1905, was graduated from the University of Michigan in 1894 as bachelor of laws.

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Public Works Contracts $34,135,142 in Week

WASHINGTON, July 14.—Contract awards for public and semi-public works projects totaling $34,135,142 were reported to the Public Works Section of the President's Emergency Committee for Employment last week. The addition of this amount brought the total contract awards reported since Dec. 1, 1930, to $1,880,635,861.

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Prices on Ingot Brass

The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of six principal mixtures of ingot brass during the twenty-eight-day period ended June 19, as follows:

Commercial 80-10-10 (1% impurities)	9.195c.
Commercial 78% metal	7.589c.
Commercial 81% metal	7.642c.
Commercial 83% metal	8.073c.
Commercial 85-5-5-5	8.264c.
Commercial No. 1 yellow brass ingot	6.477c.

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Freight Rate Hearings Started This Week

WASHINGTON, July 14.—Freight revenue of Class I railroads in 1929 from shipments of scrap iron and steel amounted to $29,428,516, while the revenue from pig iron shipments was $15,271,568. These figures are presented by the Interstate Commerce Commission in connection with a compilation of financial and operating statistics "as possibly being of service in the consideration" of the so-called 15 per cent general freight rate advance case, in which hearings will begin here tomorrow.

Revenue from furnace slag is given as $6,614,794, while revenue from products of mines is placed at $1,392,960,940. The revenues are given for specified leading groups of commodities and totaled $2,608,356,513, or 52.52 per cent of aggregate revenue, amounting to $4,966,611,486.

The report gives the net book value of Class I railroads as of Dec. 31, 1929, as $23,048,000,000. With the working capital added, the value is given as $23,701,000,000. The commission's tentative final value on the same date was $21,172,000,000.

The first hearings in the general freight rate increase proceedings will be devoted to evidence by the railroads and those supporting their plea for a horizontal advance of 15 per cent. It is expected the initial proceedings will last a week or 10 days, though this is only an estimate. After these proceedings are concluded, the case will not be resumed until Aug. 31, when protesting shippers will be heard and railroad witnesses cross-examined. The commission has announced that it must be notified on or before July 20 of appearances in opposition to the increase, together with the general character of the evidence and the approximate amount of time required. Exhibits will be used as much as possible in an effort to shorten oral testimony. It is planned to hold limited hearings also outside of Washington, but the schedule will not be arranged until the commission is in receipt of requests for hearings.

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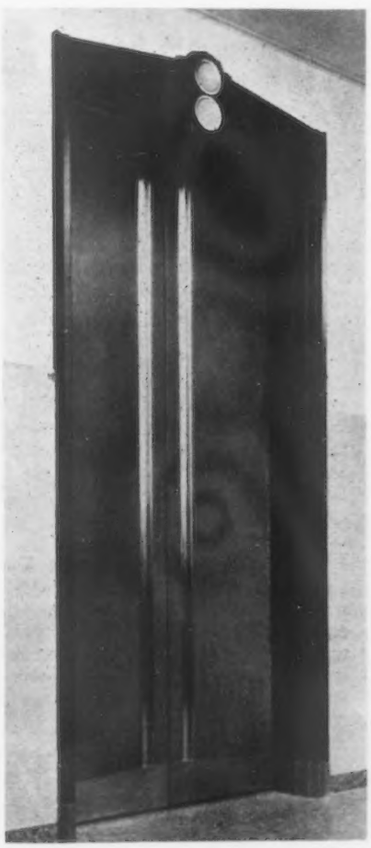

COMBINING decorative design with utility is accomplished through the use of steel, as shown in the illustration of elevator doors of green lacquered steel, trimmed with Allegheny metal, in the new Irving Trust Co. building, 1 Wall Street, New York.

Notes of the Industry

A. O. Smith Corpn., Milwaukee, is introducing a new product to be known as Smithsteel Grid, which is intended for the armoring of concrete, asphalt and other composition roads and floors. The new product consists of rings of steel 2 in. in diameter, furnished in panels 30 x 96 in., weighing 3¼ lb. per sq. ft. It is made of ⅛-in. rolled stock. The product was used experimentally for two years in the Smith plant before being placed on the market.

* * *

E. A. McCallum, who has been in charge of the San Francisco offices of the Stacey Engineering Co., has been transferred to the Pacific Coast headquarters of the International-Stacey Corporation, now located at 410 Subway Terminal Building, Los Angeles. Pacific Coast business dealing with the R-C-W Blower Division, Stacey Gas & Construction Division and the Ideco oil well equipment will be handled from the Los Angeles office.

* * *

Employment in Cleveland declined 3.2 per cent during June as compared with May, according to a report of the Cleveland Chamber of Commerce covering a survey of 100 companies. Forty-two companies in the metal-working field, including steel plants, had 14,392 employees in June, against 15,572 in May and and 15,904 in April.

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A conveying system for transferring porcelain enamel from the drying to the shipping and through the inspection department recently was installed by the Ferro Enamel Corpn., Cleveland. This is equipped with wide conveyor belts and magnetic separators for removing minute black specks from the frit.

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The Millholland Sales & Engineering Co., Indianapolis, manufacturer of automatic drilling, tapping and milling units and special production machinery, announces the removal of general offices and factory to 1145 East Twenty-second Street, Indianapolis, to secure larger and more efficient manufacturing space.

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A series of cam and gear charts and data sheets for Millholland automatic drill units, to simplify the calculations for changing the cams and gears on these machines, may be had on request of the Millholland Sales & Engineering Co., P. O. Box 1622, Indianapolis.

Five-Day Meeting Devoted to Problems of Small Plants

MANAGEMENT problems of the smaller manufacturing plants—those employing 500 or less—of which there are 193,562 as compared with 2747 plants employing more than 500 persons, is to be the theme of this year's Silver Bay, Lake George, N. Y., industrial conference. The meeting will open Aug. 10 and continue through Aug. 14. Except for the opening day, the sessions will be held morning and evening, the afternoons being left open for recreation and informal conferences.

The place, problems and opportunities of the small plant in American industry will be outlined by Burnham Finney, Detroit editorial representative of THE IRON AGE, at the opening session. The small plant's responsibility in economic and social progress, and the trade association and the smaller manufacturer will be discussed at the same session.

An address on "What Industrial Management Has Learned from the Last Two Years," by Ralph E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt., will be a feature of the evening session, the chairman of which, as well as of the morning session will be H. F. Browne, National Industrial Conference Board, New York. Wage and price movements as they affect smaller plants, and the sources and uses of industrial statistics will be other topics.

"The Possibilities of Planning and Budgeting in the Smaller Plant," a symposium led by C. A. White, treasurer Leeds & Northrup Co., Philadelphia, will occupy the third session. In the evening, discussion will center on scientific management as applied to small plant operations. Topics include discovering in advance the extent to which it is profitable to be scientific; application of motion study; practicability of a research department; and the power problem of the small plant.

A session on costs, to include discussion of standard costs for small plants, by J. P. Jordan, Stevenson, Harrison & Jordan, New York, will be followed (Wednesday evening) by a session devoted to personal relations. Speakers include A. N. Goddard, Goddard & Goddard Co., Detroit, on "Creating Conditions Conducive to Efficient Operation," and C. C. Winegardner, Diamond Chain & Mfg. Co., on "A Practical Personnel Program for a Plant of Moderate Size."

"Working Toward Greater Stabilization," is the topic planned for the morning of Aug. 13; speakers include J. W. Hook, president Geometric Tool Co., New Haven, Conn., whose subject will be "The Obligation of Industry to the Unemployed." Safety problems will feature the evening meeting. Sales problems will occupy the first session of Aug. 14. Speakers include G. T. Hodges, president of the Advertising Federation of America, New York, whose subject will be "Why Advertise?" The closing session, in the evening, will include addresses on a practical medical and health program, the field of wage incentives and a constructive training program for a small plant. C. R. Towson, 347 Madison Avenue, New York, is executive secretary of conference committee.

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This Week's News of Progress Toward Recovery

Warren Foundry & Pipe Co., 11 Broadway, New York, is operating on a five-day week schedule at its iron ore properties at Mount Hope, near Boonton, N. J., giving employment to over 100 men.

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Visco Meter Corpn., 315 Grote Street, Buffalo, is operating at capacity for production of oil gages for automobiles, aviation and marine service. A new gage for oil refineries has been developed and will be placed in quantity production within a few weeks. William A. Clare, formerly vice-president of Houde Engineering Corpn., Buffalo, is president.

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A meeting of salesmen of the National Automatic Tool Co. at the plant at Richmond, Ind., brought the statement from officials that the plant now is working at capacity days and several departments are operating night shifts.

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Alco Products, Inc., Dunkirk, N. Y., division of American Locomotive Co., New York, is running on a heavy production schedule. Company has secured large contract from Soviet Russian Government for five high-vacuum distilling units for oil refineries, with daily rating of 30,000 bbl.

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Fleming Structural Steel Co., New Castle, Pa., has resumed production on capacity schedule with full working force. Company has secured contracts for structural steel specialties for oil refining plants at Marcus Hook, Pa., and Wellsville, N. Y.

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Garfield Tool & Die Co., East Palestine, Ohio, for which a receivership was recently arranged, is operating at capacity with day and night forces under a seven-day week. Company has secured a heavy volume of new business and full operations are assured for several weeks.

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American Steel Foundries has resumed full-time production in all departments of Alliance, Ohio, plant, following receipt of a sizable volume of business for automotive castings and kindred products. Several hundred men have been recalled.

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Sands Mfg. Co., Cleveland, has been awarded a contract by the United States War Department for approximately 2000 large automatic storage water heaters to be placed in the homes of officers in Army posts. This order will keep the Sands plant in full capacity operation for 60 days.

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Fewer Cars to Be Needed Compared with Last Year

WASHINGTON, July 10.—Shipments of iron and steel products in the third quarter of the current year will require 317,440 cars, or 14.5 per cent less than the 371,465 cars required in the corresponding quarter of last year, according to estimates of the Regional Shippers' Advisory Boards made to the Car Service Division of the American Railway Association.

Loadings of coal and coke are estimated at 1,921,199 cars, or 8.2 per cent less than the third quarter of 1930; machinery and boiler loading are estimated at 35,816 cars, a decrease of 19.6 per cent; ore and concentrates at 531,463 cars, a decrease of 28 per cent; agricultural implements at 10,323, a decrease of 41.7 per cent, and automobiles, trucks and parts at 123,857, a decrease of 2.6 per cent.

Total loadings are estimated at 7,082,186 cars, a decrease of 9.3 per cent. The one sharp increase forecast relates to citrus fruits, loadings of which are estimated at 21,191 cars, an increase of 40.6 per cent.

▲▲▲ PERSONALS ▲▲▲

S. W. DUDLEY, professor of mechanical engineering and chairman of the department of mechanical engineering in Yale University, has rejoined the Westinghouse Air Brake Co. in an advisory capacity with the title of assistant to the vice-president. He will retain his university connections. After completion of his college course at Yale and a short period on the faculty, Prof. Dudley entered the employ of the Westinghouse Air Brake Co. as special apprentice in 1905 and advanced rapidly until he was appointed chief engineer in 1914, which position he retained until 1921, when he accepted the chair of mechanical engineering at Yale.

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MAJ. JAMES CALDWELL, who has returned from a tour of the British Empire, has become a member of the research committee of Quasi-Arc, Inc., New York.

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WILLIAM J. KIBLER has been elected president of the Buffalo Steel Co., Tonawanda, N. Y., succeeding the late J. G. Joseph. Mr. Kibler was formerly a vice-president of the company which he has served for over 20 years. AUGUST KLINGER now fills the post of vice-president which was left vacant by Mr. Kibler's promotion. Mr. Klinger has served the company for about 20 years.

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LINDSAY M. DONALDSON has been appointed general manager of the Massey-Harris Co., Racine, Wis. Mr. Donaldson has been associated for a number of years in various industrial enterprises with B. W. Burtsell, president of the Massey-Harris Co., Racine, and vice-president and general manager of the Massey-Harris Co., Ltd., Toronto. GEORGE WHITE continues as vice-president of the Racine company, but after Aug. 1 will become general sales manager of the entire Massey-Harris organizations, with headquarters at Toronto. W. M. LAVENTURE continues as secretary and treasurer at Racine. DAVID SELHEIMER, until now production manager at Racine, has been appointed factory manager and given supervision of the purchasing and experimental departments.

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E. A. EMERSON, president of the Armco International Corpn., export subsidiary of the American Rolling Mill Co., Middletown, Ohio, has been made chairman of the foreign trade committee of the Cincinnati Chamber of Commerce.

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ARTHUR E. PAINTER, formerly identified with the Riverside Steel Casting Co., Newark, N. J., has become New York district sales manager, with offices at 370 Lexington Avenue, for the Atlantic Steel Castings Co., Chester, Pa.

S. W. DUDLEY

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ELLSWORTH L. MILLS, formerly sales manager for the Bastian-Blessing Co., maker of welding equipment, Milwaukee, has been elected vice-president of the company and continues in charge of sales. Mr. Mills has been identified with the welding industry since his graduation from Cooper Union Institute.

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E. K. SMITH, formerly with the Stockham Pipe & Fittings Co., Birmingham, has been appointed metallurgist for the Electro Metallurgical Sales Corpn. Mr. Smith will be located in the Carbide & Carbon Building, North Michigan Avenue, Chicago, and will render metallurgical service to the customers of the Electro Metallurgical Sales Corpn., in the Chicago territory.

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NORMAN HUSTON, who resigned June 30 as district sales manager in the New York territory for Alan Wood Steel Co., has been appointed district sales manager in the New York territory for the Central Iron & Steel Co., Harrisburg, Pa., succeeding G. C. Fogwell, who has been assigned to special duty with headquarters at the company's home office.

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J. C. BLAIR has been appointed director of the dealers' division of the machine tool business of Alfred Herbert, Ltd., Coventry, England. Mr. Blair will sail for the United States within the next few weeks to visit American machine tool manufacturers who are represented by the Alfred Herbert organization in European countries.

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JAMES W. HOOK, president of the Geometric Tool Co., New Haven, Conn., and chairman of the industrial committee of the New England Council, has been appointed to membership in the President's Emergency Committee for Employment, with the special assignment of industrial coordination in New England. Mr. Hook is also chairman of the State Emergency Committee on Employment in Connecticut.

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H. C. ATKINS, president, E. C. Atkins & Co., Indianapolis, saw manufacturer, has been named president of the Manufacturers' Natural Gas Association, an organization of leading manufacturers of Indianapolis who are attempting to bring natural gas from Kentucky and the Panhandle district into the city. JAMES S. WATSON, of the Link-Belt Co., is one of the directors.

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SAMUEL MATHER, head of Pickands, Mather & Co., Cleveland, observed his eightieth birthday on July 13. In celebration of the event, he was presented with a testimonial book bearing the signatures of all the members of the organization. The presentation was made by H. G. DALTON.

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GEORGE D. SWIFT has retired after 52 years of continuous work in the iron and steel industry. He started his business career with the Carnegie Steel Co. at Pittsburgh in 1879 as a clerk in a rolling mill. He later filled posts with the Commonwealth Iron Co., Florence, Wis., the Tilden Mine at Bessemer, Mich., and the Lake Superior Consolidated Iron Mines at Duluth, and finally with the Oliver Iron Mining Co., when the United States Steel Corpn. was formed in 1901. Mr. Swift has been a director and officer of the Oliver company since 1901 and at his retirement filled the offices of secretary and treasurer.

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Steel Founders Announce Meeting Date

The first fall meeting of the Steel Founders' Society of America, Inc., will be held in Chicago on Thursday, Sept. 17.

OBITUARY

JOHN L. AGNEW, vice-president of the International Nickel Co. of Canada, Ltd., died at his home at Copper Cliff, Ont., of a heart attack due to influenza, on July 8. He was born in Pittsburgh on July 28, 1884, and, after some experience in the Pittsburgh iron and steel industry, he went to Canada in 1904 and became identified with the Canadian Copper Co., a predecessor of the Nickel company. Mr. Agnew was a past-president of the American Institute of Mining and Metallurgical Engineers.

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JAMES E. STACEY, former head of the Stacey Engineering Co., which combined with the International Derrick & Equipment Co. to form the International-Stacey Corpn., Columbus, Ohio, died of a heart attack at his home at Wyoming, Ohio, on July 6, aged 74 years. He had been active in the manufacturing and the public utilities field for more than 50 years.

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JOHN S. ARMOUR, sales manager of the Campbell-Hausfeld Co., Harrison, Ohio, agricultural implement maker, died on July 6.

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EDWARD A. ROSS, president of the Ross Gear & Tool Co. and of the Fairfield Mfg. Co., Lafayette, Ind., died in a London hospital while on a sojourn in Europe. He was graduated from Purdue University in 1907 and was joint donor of the Ross-Ade Stadium at Purdue. He was 46 years old.

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JOSEPH EASTWOOD, president and manager of the American Forge Co., San Francisco, died suddenly at his home at Mountain View, Cal., on July 1, aged 69 years. Mr. Eastwood, who was a native of England, went to San Francisco from Australia 40 years ago and organized one of the first forge companies in that city.

GEORGE EUGENE SLY, who was identified with trade and business paper publishing for some 40 years until 1924, when he retired, died suddenly while enroute through St. Charles, Mo., driving his own automobile. He was 60 years of age and lived at Asheville, N. C. For nine years he was a director of the United Publishers Corpn., devoting himself particularly to the papers serving the automobile industry.

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HARRY J. PARKE, for many years director of purchases, Gisholt Machine Co., Madison, Wis., died on July 6 after a brief illness with pneumonia. He was stricken during the recent heat wave. Mr. Parke was born in Lodi, Wis., in 1864 and became associated with the Gisholt company in 1894.

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ROBERT W. PRYOR, partner in Koithan & Pryor, New York, sales engineers, died at his home in Newark, N. J., on July 10, after a long illness. After he was graduated from Stevens Institute of Technology in 1902, he became identified with the Buffalo Forge Co., Buffalo. In 1909 the firm of Koithan & Pryor was formed.

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HARRY J. MARKS, president and general manager, Federal Steel Corpn., Detroit, was drowned July 13 at Orchard Beach, Ohio, attempting to rescue his two nieces.

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DAN B. MOORE, for 38 years associated with the Kewanee Boiler Corpn., Kewanee, Ill., died on June 19. He had been in failing health for the past year. He started to work for the Kewanee corporation at the age of 14 and was plant superintendent when he retired Sept. 22, 1930. He was born at Kewanee in 1878.

Employment Totals Lower in May

Returns gathered from identical manufacturing establishments in April and May, by the United States Bureau of Labor Statistics, show a distinct drop in iron and steel workers on the payrolls in various classes of plants. In the iron and steel plants the drop was 2.5 per cent, with 2.2 per cent off for structural steel workers, 2 per cent for foundry and machine shop products, 2.9 per cent for machine tools, 3.3 per cent for steam fittings and steam and hot-water heating apparatus, 1.1 per cent for hardware manufacturers, 0.9 per cent for stove makers, 17 per cent for agricultural implements, 2.2 per cent for electrical machinery, apparatus and supplies, 2.1 per cent for shipbuilding. Increases included 3 per cent in automobile plants and 0.7 per cent in cast iron pipe foundries.

Correspondingly, there were decreases in the total amount of payroll, aggregating 7.8 per cent for iron and steel plants, 4.1 per cent for cast iron pipe foundries, 3 per cent for foundries and machine shops, 2.8 per cent for machine tool makers, 6.2 per cent for steam-heating apparatus, 0.6 per cent for hardware manufacturers, 16.8 per cent for agricultural implements, and 1 per cent for electrical machinery. Increases included 6.8 per cent for automobile plants, 1.8 per cent for shipbuilding, 0.5 per cent for stove makers and 0.1 per cent for structural iron workers.

A. F. A. Board of Directors Hold Annual Meeting

The annual meeting of the board of directors of the American Foundrymen's Association was held July 9 at the Royal York Hotel, Toronto. N. K. B. Patch, Lumen Bearing Co., Buffalo, the retiring president of the A.F.A., opened the meeting, which was attended by some 20 members of the board.

After the report of the association for the past year had been presented, President Patch turned the meeting over to President-elect E. H. Ballard, superintendent of the foundries and pattern shop, General Electric Co., West Lynn, Mass. The board of directors then was organized for the 1931-32 term.

In addition to President Ballard, officers of the A.F.A. for the current year are as follows: Vice-President, T. H. Hammond, president, Whiting Corpn., Harvey, Ill.; and Executive Secretary-Treasurer, C. E. Hoyt, 222 West Adams Street, Chicago.

Members of the executive committee who will serve during the 1931-32 period are as follows: Chairman N. K. B. Patch, Lumen Bearing Co., Buffalo; D. M. Avey, the *Foundry*, Cleveland; Frank J. Lanahan, Fort Pitt Malleable Iron Co., Pittsburgh, and Fred L. Wolf, Ohio Brass Co., Mansfield, Ohio.

A committee was appointed to select the city at which the 1932 annual meeting of the A.F.A. will be held.

Sharp Drop in Trackwork Production

Production of trackwork for T-rail tracks of 60 lb. and heavier is reported by the American Iron and Steel Institute as having been 5705 net tons in June. This is a decline of 23 per cent from the May output of 7453 tons, and is the smallest month's total since that of January. It compares with 10,553 tons in June of last year.

For the first six months of the year the total was 42,613 tons, against 74,310 tons in the first half of 1930 and more than 85,000 tons in the first half of 1929. With the exception of the second half of 1930, when only 35,806 tons was shipped, the past half year had the smallest tonnage since these statistics have been gathered—from the beginning of 1924.

Reed-Prentice Corpn., Worcester, Mass., has removed its Detroit office to 6-246 General Motors Building, which it will jointly occupy with the Rivett Lathe & Grinder Corpn. David C. Forsman is district manager.

Seasonal Factors Point to Better Prices Later

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

STEEL ingots produced in June were at the lowest daily rate since December. After allowing for seasonal changes and for the long-time upward trend, we estimate June production at 51.6 per cent of "normal." This compares with 52.1 per cent in December, which, until June, was the low for recent years. Moreover, the June index was the furthest below normal since September, 1921.

The only question about the adjusted index touching a new low in June is the accuracy of the estimate of long-time trend. But even if we assume a sidewise trend, the merely seasonal adjustment shows June production of steel at only a slightly higher annual rate than in December. If the trend is upward, the present troubles of the industry are more likely to be temporary than if the "trend" were permanently downward.

An argument for the existence of an upward trend is that, if an index of production is adjusted for merely seasonal variations, and no "trend" is allowed for, then June production would not be so far below normal as July and August, 1924. There should be no question that the low point of this world-wide depression is further below normal than the 1924 bottom. Hence it is necessary to allow for an upward "trend," to get a truer picture of where we are in the cycle.

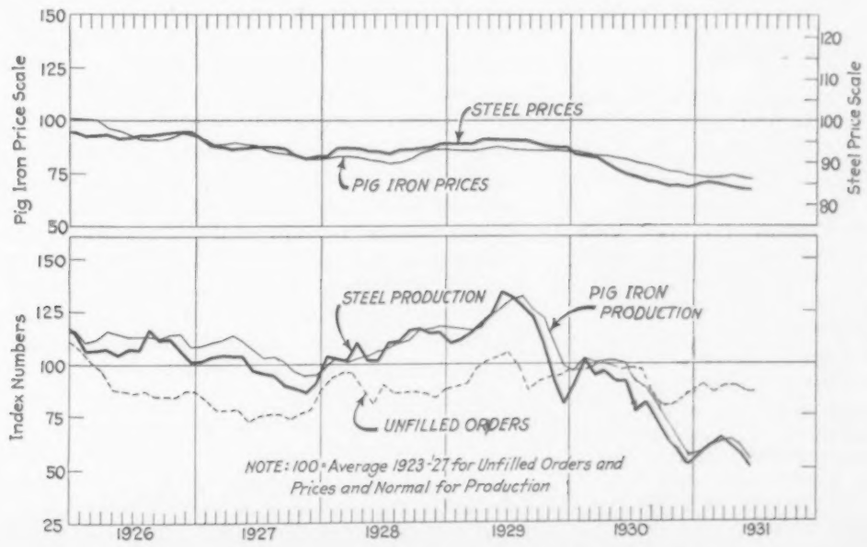
Pig iron production, also, fell to a new low for the current depression. The index for June was 55.4 per cent of estimated normal, against 57.3 per cent in December, and was the lowest since January, 1922. The percentage of capacity of blast furnaces operated, as well as the percentage operated of total furnaces available, were both less than in December.

Pig iron production declined relatively more than steel ingot production; and, while pig iron production is still comparatively large, some progress has been made toward balancing steel and iron output. Pig iron prices will probably not strengthen until correction is carried further. It may take another few months before the maladjustment between pig iron and steel production is reduced sufficiently to bring stronger prices for pig iron, but the recession is probably in its last stage.

Unfilled orders of the Steel Corporation declined more than usual in June. The decline was nearly 4 per cent against the usual decline of a little over 3 per cent. (This normal decline is based on a long period of years and allows for a downward drift of the data.) Therefore, the seasonally adjusted index declined a little more than ½ per cent. This was a smaller decline than occurred in May and is only moderately unfavorable. Shipments were probably lower than in May, and consequently sales must have fallen off, too. This conclusion conforms with the showing of our steel sales index, which was sharply lower in May.

It is now time for seasonal strength to develop in scrap, and higher prices may be expected within the next month or two. Pig iron prices usually lag scrap by one to three months. The outlook for finished steel prices is uncertain. Usually steel prices lag scrap and pig iron prices, and in depressions touch bottom some months after steel production has begun to increase (1921 and 1924, for example).

There is usually some expansion of steel production in August, but whether it will be of more or less than seasonal proportions this year is yet unknown. July will show probably a further decline in production; but, since such indexes as the P-V line and the activity in steel-consuming industries do not give definite indications of a turn, it is not possible to say that the bottom is at hand. A decline in August, however, cannot be definitely predicted.



Pig iron production, while still too high in comparison with steel, is getting into better adjustment. Prices may be weaker for pig iron, for a month or more. And the unfilled order curve was off slightly more than seasonally.

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Sentiment and Business

WE are beginning to realize how important a motivating factor in business is sentiment. Not that hope and optimism in themselves can create good business out of adversity, but they provide an atmosphere that is favorable to the operation of the more tangible factors. And certainly, it was not to be expected that these factors could display much constructive effort in the enervating atmosphere of fear that had settled, foglike, over most of the civilized world.

The Hoover proposal for a German war debt moratorium was the first substantial sun ray to penetrate this fear fog for many months. Its effect on sentiment was unmistakable, the immediate addition of five billion dollars to the public appraisal of our stock exchange securities being an indication. Unfortunately, the international jockeying for political position, which has followed the American proposal, somewhat diminished its effects.

A definite agreement upon the methods and means of stabilizing German finances will soon eventuate. In the light of this immediate expectation, it is of interest to note the effects that the new spirit of international good will has already worked in our industries. A symposium of comment on this subject from industrial executives appears on pages 193 and 194 of this issue. The concrete evidences of increased inquiries and orders already inspired by the moratorium idea should indicate the possibility of cumulative betterment in the weeks to come.

Russia Learns by Experience

STALIN recently announced a change in the Soviet philosophy and policy under the following heads:

1. Reform of the credit system, obliging every Soviet enterprise to justify its existence by earning profits.

2. Greater wages for workers of greater ability, instead of a dead level of recompense for all, making wages accord with the work performed. Efficient non-party workers cease to be discriminated against in favor of communists.

3. Wider scope to be given to individual initiative and peasants to be drawn into industry.

4. The unwieldy trusts to be abandoned and smaller, centralized management of industries introduced. Collective management to give place to individual management. The five-day week to be abandoned, where it interferes with efficiency, and longer hours substituted.

This is not to be construed as any alteration of the Russian objective, but rather an adaptation from the lessons of practical experience of the ways and means of attaining it. The Soviet political views remain unchanged, but its economic views, especially in respect of the efficiency of communism, are scrapped in favor of the methods that obtain elsewhere in the civilized world. As marking the downfall of socialism and communism as an economic dogma, however, there is no doubt. Even the exiled Trotzky admits and deplores this and thinks that the failure is due to lack of perseverance, which is of course the natural attitude of a zealot of any kind.

Stalin's change of front appears to be associated with representations by the very American engineers that he has employed, who have convinced him that the provision of plant and machinery does not insure that they will work of themselves, and that in order to make them work there must be intelligence, suitably rewarded, incentive and all the rest of the practical things of human nature.

American engineers have been handicapped in Russia by bureaucratic rules and by the ignorance and inefficiency of the labor that they were constrained to use. Part of the inefficiency of labor is due to its being underfed. There are grounds for suspicion that the great constructions under the five-year plan have been unbalanced, meaning overbuilding of some kinds and underbuilding of others.

We have never shared the fears of many in respect to the menace of Russian competition. The very idea of Russia competing with the rest of the world in manufactures has been irrational. The only real prospect has been in a few raw materials, especially wheat, petroleum and wood, but even of them the Russians will be obliged to retain a larger proportion for their own use. No country can deprive itself of too large a proportion of its production for the sake of obtaining funds for diversion into capital goods.

The new Russian policy may be a more important economic development than the moratorium for international debts. It should tend to allay the bogey of Russian competition and it should silence the mischief makers who have been proclaiming the end of capitalism while pointing to the imaginary success of communism as a modus agendi. With Moscow reverting to the principles of capitalistic operation a lot of our recent literature is destined to the scrap heap.

INDIVIDUALISM, or capitalism, is the philosophy that human beings may enjoy the living that they earn. It correlates with the natural law of the survival of the fittest. Communism is the philosophy

that every one is entitled to a living. Between these extremes there are many shades of thought. Even under capitalism there grows the idea that the world owes to everybody a living; and even just the kind of a living that anybody desires.

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Government Learning About Coal

NEITHER the Administration's conference with representative bituminous coal operators last Thursday nor the one arranged to follow, with officials of the United Mine Workers, could be expected to furnish matter for frank and illuminating Washington press dispatches, but the history of the industry in the last third of a century shows exactly what the Secretaries of Commerce and Labor needed to be informed about and to concern themselves with.

The troubles of the industry date from the blunder of 1898, when the United Mine Workers were allowed the check-off. This in essence established automatic unionism, initiation fees, dues, fines and assessments being deducted by the payroll clerk and remitted in lump sums to the union local. It was a fine piece of strategy, but it did not work. Many of the ills the coal trade has suffered during the last third of a century, interspersed by various periods of peace and prosperity, were the result of it.

The union operators of the Pittsburgh district and fields to the west had two burdens, the union and the competition of non-union operators to the south, in West Virginia and Kentucky. They could shake off neither one and they felt there was one too many. Hence came the idea of giving the check-off, strengthening the union and encouraging it to unionize the southern fields. The union poured millions of dollars into West Virginia and hundreds of lives were sacrificed but the end was not gained. The union fields had to pay high wages and the southern fields took more and more business from them, increasing their capacity accordingly, while the small number of days worked a year in the northern fields was made basis for a plea that wage rates should be correspondingly high to compensate.

For quite a while the union operators got along in a way that seemed somewhat well, utilizing a loophole in the Sherman law, which prohibits agreements in restraint of trade, but not disagreements. So when a scale expired the operators would disagree with the union until coal got scarce, whereupon they would sign up and try to hold prices as long as possible.

Meanwhile the nonunion operators increased their capacity, and then came the war with a further increase. A year after the Armistice occurred the great strike, ended by the Garfield advance, which held to April 1, 1922. Then the union operators wanted a reduction, 30 per cent being the proposition of the Pittsburgh district, with discontinuance of the check-off. Aided by the unexpected extension of the strike into the long nonunion Connellsville region and by railroad strikes that curtailed movement of southern coal north, the union won the strike by the Cleveland settlement in August.

Congress set up the United States Coal Commission, which found out everything, but nobody did anything. While the commission was at work it requested the operators to renew for a year, and then came the three-year Jacksonville settlement, running to April 1, 1927. Meanwhile the union practically foundered and a rump organization, which became radical, was formed, and this, the "National Miners' Union," has been making much of the recent trouble.

It has been needful therefore that the United Mine Workers officials be asked why they harassed the northern operators, allowing the southern competitors of both union operators and union mine workers to grow, and why the union was so conducted as to encourage the formation of the rival union. Should it mend its ways by recognizing fully the competitive conditions and by becoming democratic instead of autocratic, there is possibility of some good work being done to improve the bituminous coal situation.

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The Petroleum Fiasco

FROM the new great oil field in east Texas petroleum is being sold at 10 cents a barrel, or even less. Wells that are already flowing yield some revenue at that price, but perhaps not enough to pay for attending to them, and certainly not enough to redeem the cost of creating them. None but fools will therefore do any more drilling.

The competition of this oil has reduced the price in other fields to unprofitable terms. Thus, there has been ruined a great investment in petroleum production and there will ensue a great waste of an irreplaceable resource of nature, for a gutted oil field will never yield as high a percentage of its content as if it were properly handled. There is no wonder that the people of Texas and Oklahoma are exercised over the misuse of a great asset from which they expected to derive a large revenue for the welfare of their people.

This does not mean that the petroleum industry, representing an investment of ten or eleven billion dollars, is ruined as a whole. The greater part of this investment is in the pipe lines, tanks, ships, refineries and distributing facilities of the large companies. Of all that equipment there will continue to be profitable use, for the requirement for gasoline will naturally increase. The refiners will get their crude for a while practically as a gift and will earn from the carrying and converting of it. The excessive competition among themselves in the final selling of the product will be corrected by the extinction of the smaller refiners and the good sense of the giants of the industry, who will be the sole survivors.

Even the giants will probably make poor showings in their reports for 1931, but it may be considered that those will largely reflect the writing down of inventories, which some day will be written up to a more or less extent. There seems to be no good reason why the great companies should continue to

produce crude petroleum when there are enough of the foolish to do it for them; or if they continue to produce their own crude supply, they may figure that they are doing it at cost.

In this situation the State governments will doubtless intervene more powerfully than they have done heretofore. A fundamental difficulty has been in respect to the invasion of the rights of private property. Theoretically the owner of a 40-acre tract possesses the oil and everything else that underlies it and has an inalienable right to drill for oil or anything else. In so doing, however, he may get not only his own oil but also that of his neighbors, and through inherent inability to produce legal proof thereof the neighbors have no redress.

In such circumstances the State may have the right to rule under its taxing power, or its police power, or even in the interest of common welfare more or less as it may control water supplies and make sanitary provisions. It is clear that this issue is now coming to a head. If unrestrained, selfish competition be allowed to destroy petroleum production, obviously we should have no supply after the gushers have ceased to flow and the storage tanks have been emptied. It is next to needless to remark that in this situation there is a national interest far broader than what concerns the States of California, Oklahoma and Texas.

▲▲▲ CORRESPONDENCE ▲▲▲

High Rates of German Tax on Incomes

To the Editor: As department manager of a German steel works company (Wolf Netter & Jacobi-Werke Kommanditgesellschaft auf Aktien, Berlin) I am a regular reader of THE IRON AGE. The excellent article of Mr. Charles Morris Mills, entitled, "John Bull Tries to Mend Fences," in the number of April 2 raised my keenest interest, as it deals with problems which you are well aware we are tackling also in this country, although under economic conditions quite different from those in Great Britain.

Mr. Mills gives the sources of the facts from which he draws his conclusions; thus the reader is in a position to judge the facts himself, so that perhaps other conclusions may result. This is the case with the data quoted from a paper of the (British) National Federation of Employers' Organizations concerning the amount of taxes per head in various countries (England 100, France 64, Germany 50, Belgium 38, Italy 30).

These numbers are apt to mislead the reader; for it is obvious that a man earning $1,000 a year who pays $100 in taxes bears a heavier burden than a man earning $5,000 who pays $200, the former being taxed at the rate of 10 per cent of his income, the latter at a rate of only 4 per cent. The same applies to the numbers mentioned above. The absolute amount of taxes per head does not prove anything; the important question is: *what percentage of the average income* is taxed per head?

If you arrange the countries mentioned according to these percentages, you will find Germany in the first place, i.e., most severely taxed of all.

It would certainly serve to clear misunderstandings that arise daily, perhaps even among the readers of THE IRON AGE, if you instituted an inquiry into German conditions along the lines of Mr. Mills' article, bearing in mind the percentage of income taken away by taxes in this country as compared with other countries.

ALBRECHT MELCHIOR.

Berlin, Germany.

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Opposed to Freight Rate Advance

To the Editor: Issue of THE IRON AGE July 9 with your editorial on proposed increase in freight rates is before me. How is it possible to seriously contemplate an increase in freight rates with commodity prices stationary at lower levels than for years, some commodities still falling in price and little prospect of any immediate rise?

A year ago we could buy a ton of steel at Pittsburgh for $64. The freight to Montreal was $10.40, or roughly 16.25 per cent of the price of the steel at the mill. The same steel can be purchased today, according to this issue of your journal, for $58 per ton. The freight rate, therefore, jumps at once from 16.25 to 17.90 per cent of the cost of the steel. If freight rates are increased 15 per cent, as suggested, the cost of carrying a ton of steel to Montreal to the price of the steel jumps at once from 17.90 to over 20 per cent.

Do you seriously think the producers of basic commodities such as wheat, meats, cotton, lead, zinc, copper, lumber, coal, etc., will submit to an increase in freight rates on the cost of carrying their materials to market, when these materials are being produced and marketed at cost and in many cases less than cost?

A. K. CAMERON,

Montreal. Eastern Steel Products, Ltd.

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Cobalt High-Speed Steels

INFORMATION concerning the performance of "Arbed-supercobalt" steel in comparison with other types of high-speed steel is given in *Aciers Speciaux, Metaux et Alliages*, February, 1931. The analyses of the three steels compared were:

	C	Cr	W	V	Co	Mo	
No. 1....	0.70	4	18	1.2	0.0	0.0	
No. 2....	0.75	5	18	1.2	6.0	0.8	
No. 3....	0.78	4	18	1.5	18.0	0.5	"Supercobalt"

On cast steel of 114,000 lb. per sq. in. tensile strength the following lengths of cut were made at 42 ft. per min., 0.05 in. lead, and 0.2 in. depth: (1) 4⅜ in., (2) 6⅞ in., (3) 21 in. The superiority of No. 3 is more marked in cutting hard materials, as shown by life of the tool in roughing down cast iron rolls of 210 Brinell hardness. Steel No. 3 still had a good edge after cutting a length of 39½ in. at a speed of 46 ft. per min., ⅛ in. lead, and ¾ in. depth, while No. 2. and No. 1 were dull after cutting 4 in. and 3 in. respectively.

The supercobalt steel is especially suitable for: (a) working of chilled cast iron, permitting a speed of 12 to 13 ft. per min. on the skin, and 16 ft. per min. in roughing; (b) quenched steels of 170,000 to 200,000 lb. per sq. in. tensile strength; (c) surfacing large pieces of cast iron; (d) machining manganese (12-14 per cent Mn) steel, 13 to 16 ft. per min.

Chemical Composition as a Basis for Classifying Steel Castings

(*Concluded from page* 175)

user thinks of the material largely in terms of chemical composition and for this reason it is desirable that the metallurgists' reasons for placing steel in a certain classification should be correlated in some way with chemical comparison. To accomplish this end a metallurgically scientific basis for classifying steel should be adopted, he said.

Cooperation with Finished Steel in Classification

The steel foundry industry should work with the rolled and forged steel industry to bring about a classification, declared J. H. Hall, Taylor-Wharton Iron and Steel Co., who was chairman of the meeting. This would take a long time, but he hoped a start would be made. Major Bull suggested that specifications be worked out the same way for cast steel as for rolled and forged steel. W. C. Hamilton, American Steel Foundries, declared that nomenclature is allied with getting up specifications for steel castings, and adoption of classifications will be very difficult because the industry is going through a period of development. He doubted whether intelligent specifications and nomenclature could be adopted until the industry had developed further. However, it was a subject that should be given continued attention. Mr. Hall doubted whether this is an opportune time to appoint a committee to start classification of alloy steels. Another speaker said that it would take years to get away from the present commonly used designations.

It was decided to recommend to the American Foundrymen's Association the appointment of a committee to start a study of the classification of alloy steels.

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Developments in By-Product Coke Production

(*Concluded from page* 165)

retard an otherwise accelerating demand for coke and coke oven gas for domestic and industrial heating.

Trends in Value of By-Products

In 1913 the average value of by-product coke was $3.38, the value of the by-products per ton of coke was $1.41, and the cost of coal per ton of coke was $3.27. In 1929 the value of the coke had risen to $4.80 a ton, the value of the by-products to $3.60, and the cost of coal for a ton of coke to $5.07. The by-product values in 1929 were 155 per cent higher than in 1913, although the coke value had increased only 25 per cent and the cost of the coal 55 per cent. Actually the increase in the total value of coke plus by-products in this period (60 per cent) was little more than the increase in the cost of the coal.

Not only has the by-product oven displaced the beehive oven as a producer of metallurgical coke, but it has in recent years taken an important position in supplying base-load gas for city use in conjunction with coke for the domestic fuel trade. It is probable that further extensive developments in this direction will be arrested to some degree in regions served by long-distance natural gas pipe lines, and possibly by the increasing amounts of refinery gas now becoming available. At present these refinery gases and liquefied gas, such as propane and butane, are supplementing rather than displacing coke oven gas. The future interrelation of these various types of gases is difficult to predict.

Declining prices of ammonia, due to cheap synthetic ammonia, have made profitable recovery of this by-product a real problem. European investigators have attempted to avoid purchase of sulphuric acid for ammonia recovery by utilizing the sulphur in the coke oven gas. Two new processes for the conjoint recovery of sulphur, ammonia and cyanogen compounds have been developed in Europe and are being given large-scale tryouts.

In America the sulphur recovery purification process is making excellent progress and promises to give a new by-product sulphur peculiarly adapted to fungicidal and agricultural purposes. The problem of ammonia still waste disposal has been solved. Phenol, the troublesome constituent of these wastes is recovered in salable form, 85,000 gal. of crude phenols having been obtained in 1929.

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Mold-Handling Methods

(*Concluded from page* 173)

to be placed overhead. This did away with the costly overhead steel work, and also made it possible to locate the motors and driving machinery at the floor level.

What is commonly referred to as the slide type is perhaps the most widely used of all the different designs. It has been in general use for a number of years and is still popular, being economical in first cost and very effective for handling light molds not weighing more than 150 lb.

Various designs of this machine have been made, all of which use two T-rail tracks for supporting the mold tray. On the early slide-type conveyors the chain was carried on a separate pair of rails and was equipped with dogs or attachments for pushing trays along the tracks. On later designs the chain is attached directly to the trays and is carried by them, eliminating the extra rails. While in most cases the tray slides directly on the rails, a few have been made in which the trays are fitted with rollers. The smoothest travel is obtained with the sliding trays, as these keep the tracks cleared, while the rollers on the truck trays tend to ride over any obstructions of metal or sand, causing jolts, or will slide, due to shot on the rails, resulting in flat spots on the rollers.

The most general application of the sliding-type conveyor is for the handling of snap-flask and the smaller tight-flask molds, although quite a few are handling molds weighing 300 to 400 lb.

To eliminate a crane or hoist handling from the molding station to the conveyor for these heavier molds, the cope and drag are built on a stationary section of gravity conveyor placed at right angles

to the power-driven mold unit. The tray tops of the power mold conveyor also consist of gravity rolls, which permit rolling the molds on to the conveyor tray from the stationary gravity conveyor as it passes the molding station.

For long conveyors handling molds weighing more than 200 lb., experience and study have shown the advisability and economy of utilizing "anti-friction" roller design. In the last few years several durable and effective designs of "anti-friction" roller and car-type mold conveyors have come into general use.

Standardization of mold-handling devices has been carried on insofar as it is possible to do so, and for most problems it will be found possible to purchase suitable standard conveyors, cranes, hoists, or trucks at reasonable cost.

All too often tremendous expenditures are made for special and expensive equipment when actually standardized designs would prove much more effective and economical.

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Steel Consumption in the United States and Germany

(*Concluded from page* 179)

try (1930, 160,900 tons), amounts to only 0.6 per cent of the total sales, whereas the German use of 126,000 tons in 1928 amounted to about 1.5 per cent of the total German sales of rolled steel.

Steel used by the German machine industries in 1927 amounted to 2.6 million tons (estimated), which corresponds to about 25 per cent of the total Germar production of rolled steel. In contrast with this the American machine industries used in 1929 and 1930 only about 2 per cent, 730,000 tons and 568,000 tons respectively.

These few comparisons are sufficient to show the different fractions of the steel consumption in the United States and Germany used by the various groups of consumers. They also show how defective the German classification still is.

Government Orders Heavy in Germany

Brief mention may also be made of the significance of the State and National orders in Germany. Only the values are known, the total of these orders amounting to 1150 million marks in the fiscal year 1929, of which 27.4 per cent or 315 million RM went to the mining and the steel industries; 5 per cent or 57.6 million RM to the iron, steel and metal manufacturing industry; 18 per cent or 208 million RM to the construction of machines, apparatus and vehicles; and to the construction industry 11.2 per cent or 129 million RM.

Results of the official German census of the production of the machine industry and the small iron industry for 1928 should be very much worthwhile. Unfortunately the results are not yet ready. However valuable these statistics may prove for determining the nature of the consumption structure, the sales data collected from the steel industry and classified as to application groups are of much greater practical importance for estimating the probable demand from a business angle.

Not only will the steel associations and the iron and steel companies learn to use the monthly classifications of steel consumption as business barometers to guide their technical and commercial management, but business will find the knowledge to be obtained from these statistics useful. As soon as usable statistics of total production of the associations are available, it will be possible for the individual works to construct comparisons on the basis of their own perforated cards.

As all the participating parties are interested in the most complete consumption statistics possible, it may be assumed that we shall soon catch up to the advanced position of America in this field.

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Practical Side of Metallurgical Heat Application

(*Concluded from page* 181)

sia. This engine had wooden cylinders and wooden pistons, and leather valves. It was still functioning at the time it was replaced, but natually it was not functioning at a high degree of efficiency.

Fuel engineers who cannot bring their metallurgical equipment above the 20 per cent fuel efficiency, which is that reported for open-hearth furnaces and other units, are, Mr. Foss believes, as far behind where they should be as that old engine was.

Blame for this situation was placed squarely on the shoulders of management. At the same time the fuel engineers themselves must share this blame for not being able to sell to management the fact that they must have adequate equipment to work with, and must have instruments and control devices if they are to perform any better. The speaker expressed the view that the fuel engineer is just as important a functionary in the steel mill as is the chemical engineer or metallurgist, who is watching more directly the quality of the product.

Why Not Back Up the Specialist?

This point of view brought Joseph L. Shadgen, Smoot Engineering Co., New York, to his feet with the query, "Why does not management accept the fuel engineer instead of repulsing him?" He has been hired to solve a definite problem. Yet often decisive steps are taken, in his province, about which he is not even consulted in advance.

Comparison of fuel records was strongly advocated, both by Frank E. Leahy, fuel engineer, Youngstown Sheet & Tube Co., and by the author of the paper. Mr. Leahy said that the records should be in such shape as to give not only interplant comparisons within a company, but inter-company comparisons all along the line. Mr. Dobrin regards adequate records as the most important means of bringing home to management the value of what the fuel department is doing, and of obtaining the necessary appropriations for improving still further the economy of combustion, with all the attendant benefits in quality and quantity of product.

Industrial Shutdowns Reduce Steel Buying Still Further

INGOT Output Not Above 32 Per Cent of Capacity—Both Weakness and Strength in Price Situation — Detroit Bar Base Likely

WIDESPREAD industrial shutdowns for vacations and inventories, together with the generally poor business conditions in most steel-consuming lines, have further restricted steel buying and plant operations.

Although erratic schedules make it difficult to estimate the rate of steel production for the industry as a whole, the average for this week is not above 32 per cent of capacity, compared with 33 per cent a week ago, with slight curtailment likely before the end of the month. Present activity is only a little above the low point of last December.

Operations have gained a trifle in the Chicago district, where one steel company blast furnace, recently banked, has been put back in service. A steel company blast furnace has also been blown in at Buffalo. Elsewhere, pig iron and steel production is off from last week or barely maintaining the recent rate.

NOTWITHSTANDING belief of the steel industry that resumption of manufacturing by many steel consumers in August will bring a moderate improvement in replenishment buying, there is no evidence yet of a definite turn upward in requirements. Some large tonnages, particularly for building construction, are overhanging the market, but there is a disposition to await more favorable conditions in the general situation before making awards.

Two outstanding orders are 20,000 tons of rails for the Norfolk & Western and 15,000 tons of seamless pipe for the Atlantic Refining Co. for a line in east Texas. Tentative awards of 110,000 tons of structural steel, reinforcing bars and cables for the Golden Gate bridge, San Francisco, have been made, but formal contracts await the sale of bonds for the project. For an elevated highway in New Jersey, 17,100 tons of structural steel has been ordered.

Manufacturing consumers of steel are buying very sparingly. A number of automobile plants are using up inventories of materials and parts preparatory to shutdowns. Some of these plants will be idle during the latter half of July. Railroads are taking very small shipments of rails. Tin plate shipments are tapering, though production is holding at about 65 per cent of capacity. In other lines, excepting structural steel and reinforcing bars, in which mills have fair backlogs, the demands upon finishing mills are the lightest of the year.

THE price situation on finished steel and raw materials offers unusual contradictions. While makers of sheets and strip steel are holding firmly to higher third-quarter prices, there is a disposition among producers of bars, plates and shapes to accept 1.60c. a lb., Pittsburgh, on the larger orders, or $1 a ton under the quotation that was to apply on third-quarter contracts. On reinforcing bars to distributers, 1.60c. has been established as the minimum to check price irregularities that have been prevalent in that commodity. At the same time an advance of $2 a ton has been announced on wire products except manufacturers' wire and woven wire fence.

A prospective development of the next week or two is the establishment of a Detroit base on steel bars coincident with the starting up of the new bar mill of the Great Lakes Steel Corpn. at Detroit. The Detroit bar base will be $3 a ton above the Pittsburgh price. This innovation is likely to extend to sheets and strip steel, which are also made by Detroit mills.

Steel scrap has gained 25c. a ton in the average price at Pittsburgh for the second time this month, but has declined an equal amount in eastern Pennsylvania and is weak at Chicago and firm at Detroit. Pig iron tends toward weakness in the Valleys and at Pittsburgh, though quoted prices are not actually lower. Concessions have also been made in New England and on Lake iron sold in southern Ohio.

THE German financial crisis has injected an element of uncertainty, though what effect it has upon the already depressed state of domestic business is difficult to measure. Its influence has been adversely felt, however, in the copper and tin markets, which are more quickly responsive than steel to international movements. In the present need for developments that will mold a confident business psychology, the successful bridging of the European difficulties will no doubt restore some of the hopefulness that was engendered by the Hoover moratorium plan.

The drop of 141,129 tons in the unfilled orders of the United States Steel Corpn. as of June 30 was in line with seasonal tendencies and was only a little above the 10-year average, 137,000 tons, of declines on that date.

THE IRON AGE composite price for pig iron has declined 3c. a ton to $15.56, a new low, running back to the autumn of 1915. Finished steel, at 2.137c. a lb., and steel scrap, at $9.17, are unchanged.

PITTSBURGH

Steel Specifications Very Light—Scrap Stronger—Pig Iron Weak

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PITTSBURGH, July 14.—Finished steel specifications during the last week have been exceptionally light, and scarcely any new business is reported. Summer suspensions by a growing number of large consumers, particularly in the automobile industry, are beginning to be felt by the steel companies, and many believe that the next two weeks will see the low point in demand for the year. Prospect of improvement in August is not very clear as yet, and much now depends upon factors which can do so much to mold business psychology. While many buyers of steel are slow to recognize a turn in general business conditions, it is reported that many large projects requiring heavy tonnages will be released as soon as any improvement is shown in the general situation.

Outstanding developments during the past week have been very meager. A local pipe maker has taken an order for 15,000 tons of 10¾-in. seamless tubing for a line from the east Texas fields, but now the pipe line market is more devoid of active inquiry than has been the case for some time. Other projects are still pending, but delays in financing and other details may postpone contracts until next season. One or two fabricators report a slight gain in structural steel inquiries in the last week or two, but reinforcing bars continue rather dull as contrasted with fairly satisfactory shipments against contracts placed earlier in the year. Demand for tin plate is off slightly, and shipments this month are falling under the June levels. Production, however, is well maintained at about 65 per cent of capacity.

Steel ingot output in the Pittsburgh district this week is estimated at slightly above 30 per cent of capacity, and, from the standpoint of tonnage being turned out, is barely above the December low point. One independent plant in the district which has been inactive for about a month has resumed operations in three open-hearth furnaces. This gain has been largely offset by curtailment on the part of the large interest in the locality. Production in the Wheeling district is holding at about 50 per cent of capacity, the comparatively high rate being traceable to the high output of a company which is accumulating raw steel. Activity in the Valleys is not above 35 per cent. Finishing mill production has not changed materially although sheet schedules last week showed some improvement over June, and the gain will be held this week. Much of this tonnage has come in as a result of the advances in prices made on July 1.

Summer suspensions of consumer plants increasing in number.

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Line pipe order for 15,000 tons for East Texas closed.

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Steel operations slightly above 30 per cent of capacity.

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Sheet schedules show sustained improvement over June, partly the result of July 1 price advances.

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Steel scrap maintains strong tone of last two weeks.

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Steel prices in general are being well maintained on the small orders which are making up the bulk of current business. This is particularly true in the case of sheets and strip steel, on which the recent price advances apply. Makers of nails and merchant wire products have also issued new schedules, reaffirming those made earlier in the spring, which call for a price of $1.90 a keg on nails to jobbers. This represents an advance of $2 a ton over recent quotation. Prices of reinforcing bars are now generally adjusted to the 1.60c., Pittsburgh base. Purchase of a substantial tonnage of No. 1 heavy melting steel at $11 is the feature of the market on raw materials this week. This advances the current scrap market slightly and justifies the stronger tone which has prevailed for the last two weeks. Pig iron is still very dull. Coal is more freely available in the Pittsburgh territory because of waning strike activity.

PIG IRON

Shipments this month are falling behind those of June, as foundry operations in the district are the lightest of the year. Many plants are only running one day a week, and the larger melters are affected the same as the small ones. The Westinghouse Air Brake Co., Wilmerding, Pa., is reported to have placed a small tonnage of foundry iron. No other sales are reported except the usual carload lots which come in from day to day. The price of foundry iron is rather weak, and some consumers report that they are able to buy at less than $17, Valley, and $17.50, Pittsburgh furnace. No sales at lower figures have come to light. Bessemer and malleable iron are holding at the recent levels, with the basic grade nominal in the absence of sales.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$15.50 to $16.00
Bessemer	17.00
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.00
Low phos., copper free	26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$16.00 to $16.50
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Bessemer	17.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

SEMI-FINISHED STEEL

Shipments this month are holding up to June levels, largely because of the slightly higher operations of non-integrated sheet mills. No new buying is reported, and prices continue nominal at $29 to $30, Pittsburgh, for billets, slabs and sheet bars. Wire rods and forging billets are unchanged at $35.

RAILS AND TRACK ACCESSORIES

The Norfolk & Western Railroad has closed against its recent inquiry for 20,000 tons of rails. A Pittsburgh producer received 15,000 tons. No other rail inquiry has appeared, and releases on accessories are still very light.

BOLTS, NUTS AND RIVETS

Lighter releases from the automobile industry have reduced aggregate bolt and nut tonnage this month, and demand from railroads is barely holding its own. Structural steel fabricating operations are at their height for the season and form a large outlet for current shipments of rivets. Prices are well maintained since the recent reduction, with bolts and nuts now quoted at 73 and 10 per cent off list, small rivets at 70, 10 and 5, and large rivets at $2.70 a 100 lb.

BARS, PLATES AND SHAPES

While better business sentiment had generally been expected to bring out additional tonnage in the heavy hot-rolled products, the change to date has been scarcely noticeable. One or two fabricators report a meager increase in structural inquiries, and barge builders still have considerable prospective tonnage in the offing. Buyers of river craft, however, are very cautious, and one barge company reports as much inquiry has come out

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	July 14, 1931	July 7, 1931	June 16, 1931	July 15, 1930
No. 2 fdy., Philadelphia	$17.01	$17.01	$17.26	$19.76
No. 2, Valley furnace	17.00	17.00	17.00	18.00
No. 2 Southern, Cin'ti	14.69	14.69	14.69	16.19
No. 2, Birmingham	12.00	12.00	12.00	14.00
No. 2 foundry, Chicago*	17.50	17.50	17.50	18.00
Basic, del'd eastern Pa	16.75	16.75	17.00	18.75
Basic, Valley furnace	15.50	15.50	15.50	18.00
Valley Bessemer, del'd P'gh.	18.76	18.76	18.76	20.26
Malleable, Chicago*	17.50	17.50	17.50	18.00
Malleable, Valley	17.00	17.00	17.00	18.50
L. S. charcoal, Chicago	25.04	25.04	25.04	27.04
Ferromanganese, sea'd carlots.	†85.00	†85.00	†85.00	94.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Ferromanganese quotations adjusted to carload unit, larger quantities sold at discounts.

Rails, Billets, Etc., Per Gross Ton:	July 14, 1931	July 7, 1931	June 16, 1931	July 15, 1930
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	34.00	34.00	34.00	36.00
Rerolling billets, Pittsburgh	29.00	29.00	29.00	31.00
Sheet bars, Pittsburgh	29.00	29.00	29.00	31.00
Slabs, Pittsburgh	29.00	29.00	29.00	31.00
Forging billets, Pittsburgh	35.00	35.00	35.00	36.00
Wire rods, Pittsburgh	35.00	35.00	35.00	36.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.65	1.65	1.65	1.70

Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.65	1.65	1.65	1.65
Bars, Chicago	1.70	1.70	1.70	1.75
Bars, Cleveland	1.65	1.65	1.65	1.75
Bars, New York	1.98	1.98	1.98	1.98
Tank plates, Pittsburgh	1.65	1.65	1.65	1.65
Tank plates, Chicago	1.70	1.70	1.70	1.75
Tank plates, New York	1.93	1.93	1.93	1.93
Structural shapes, Pittsburgh	1.65	1.65	1.65	1.65
Structural shapes, Chicago	1.70	1.70	1.70	1.75
Structural shapes, New York	1.90½	1.90½	1.90½	1.90½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh	1.55	1.55	1.55	1.65
Cold-rolled strips, Pittsburgh	2.15	2.15	2.15	2.45

Finished Steel, *Per Lb. to Large Buyers:*	July 14, 1931 Cents	July 7, 1931 Cents	June 16, 1931 Cents	July 15, 1930 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.15	2.45
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.50	2.50	2.35	2.65
Sheets, galv., No. 24, P'gh	2.90	2.90	2.75	3.15
Sheets, galv., No. 24, Chicago dist. mill	3.00	3.00	2.85	3.25
Hot-rolled sheets, No. 10, P'gh.	1.70	1.70	...	...
Hot-rolled sheets, No. 10, Chicago dist. mill	1.80	1.80	...	...
Wire nails, Pittsburgh	1.80	1.80	1.80	2.05
Wire nails, Chicago dist. mill	1.85	1.85	1.85	2.15
Plain wire, Pittsburgh	2.20	2.20	2.20	2.30
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.35
Barbed wire, galv., Pittsburgh	2.55	2.55	2.55	2.80
Barbed wire, galv., Chicago dist. mill	2.60	2.60	2.60	2.85
Tin plate, 100 lb. box, P'gh	$5.00	$5.00	$5.00	$5.25

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$10.50	$10.25	$10.25	$14.75
Heavy melting steel, Phila	8.25	8.50	9.50	12.50
Heavy melting steel, Ch'go	8.75	8.75	8.75	12.00
Carwheels, Chicago	10.00	10.00	10.00	13.50
Carwheels, Philadelphia	12.00	12.00	12.00	14.50
No. 1 cast, Pittsburgh	10.50	10.50	10.25	13.50
No. 1 cast, Philadelphia	11.50	11.50	11.50	13.00
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.00	12.00
No. 1 RR. wrot., Phila	10.00	10.00	10.00	15.00
No. 1 RR wrot., Ch'go (net)	7.00	7.00	7.00	10.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.40	$2.40	$2.40	$2.50
Foundry coke, prompt	3.50	3.50	3.50	3.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	8.12½	9.12½	8.37½	11.62½
Electrolytic copper, refinery	7.50	8.00	7.75	11.25
Tin (Straits), New York	24.62½	26.00	22.75	29.50
Zinc, East St. Louis	3.90	3.95	3.40	4.12½
Zinc, New York	4.25	4.30	3.75	4.47½
Lead, St. Louis	4.22½	4.22½	3.60	5.15
Lead, New York	4.40	4.40	3.75	5.25
Antimony (Asiatic), N. Y.	6.90	7.00	6.05	6.85

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

and been dropped this year as the total of business placed. Shipments of reinforcing bars are well maintained in view of heavy road construction programs in nearby States, but no large inquiry has appeared recently. The Louisville & Nashville Railroad will buy 750 tons of bars for the approaches to its bridge over the Ohio River at Henderson, Ky. Bids will be closed next week on the South Tenth Street bridge at Pittsburgh, which will take 4300 tons of structural steel and a substantial tonnage of wire cable. Inquiry is expected in the near future on the superstructure of the Pittsburgh Post Office, which will take a round tonnage of structural steel. Shipments of bars and plates to manufacturing industries are light and are still declining. Railroad car builders in the district are engaged only intermittently. The requirements of finishing mills are the lowest they have been in years.

COLD-FINISHED STEEL BARS

Business this month is falling somewhat under that of June, but prices are well maintained at 2.10c., Pittsburgh. Current operations for the industry average about 20 per cent of capacity.

WIRE PRODUCTS

Little change is reported in this market, as no significant improvement in merchant demand is expected until after crops are harvested. In the meantime manufacturers' wire is somewhat less active, and buyers are very conservative in specifying their needs. Makers of merchant wire products have issued new price schedules, naming minimum prices of $1.90 a keg for nails to jobbers, and $2 to consumers. While this represents an advance of $2 a ton over the actual market, it is really an affirmation of the last official schedules issued. Other merchant products are affected accordingly. Manufacturers' wire is unchanged at 2.20c., Pittsburgh.

SHEETS

Sheet mill operations were somewhat higher last week, approaching 40 per cent of capacity. A considerable part of this tonnage resulted from orders placed late in June, prior to price advances. Mills are still occupied with this tonnage and schedules this week are not materially under those of last week. New business is almost entirely lacking, but all mills report a few current orders placed at the recently adopted prices. The new schedules still require considerable missionary work on the part of salesmen, and it will be another week before any real test of the new prices is made on contract orders.

TIN PLATE

Shipments this month are falling slightly under the high levels established during June, but this is according to seasonal precedent. The early pea crop has been largely taken care of and has been fully up to normal. Operations are holding at about 65 per cent of capacity, where they have stood for three weeks. A slight decline would not be unexpected in the latter half of the month.

STRIP STEEL

Makers of strip steel are receiving a number of suspension orders from makers of automobiles and acces-

THE IRON AGE COMPOSITE PRICES

	Finished Steel	Pig Iron	Steel Scrap
July 14, 1931	2.137c. a Lb.	$15.56 a Gross Ton	$9.17 a Gross Ton
One week ago	2.137c.	15.59	9.17
One month ago	2.102c.	15.63	9.50
One year ago	2.171c.	17.09	13.08
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1931	2.142c., Jan. 13	2.102c., June 2	$15.90, Jan. 6	$15.56, July 14	$11.33, Jan. 6	$9.08, June 23
1930	2.362c., Jan. 7	2.121c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

sories, and current tonnage releases are the lightest of the year. Producers are not able to close down entirely from week to week because of the urgency for delivery of small orders, but most of them are not running their individual mills more than three or four turns each week. Some encouragement is found in the price situation, which is regarded with optimism by all makers. Consumers are now more willing to contract for their needs over the remainder of the quarter at 1.55c., Pittsburgh, for hot-rolled strip from 6 to 24 in. wide and 1.65c. for narrower material. Cold-rolled is also well maintained at 2.15c., Pittsburgh or Cleveland, with small lots bringing 2.25c.

COKE AND COAL

Coal production in western Pennsylvania is rapidly approaching normal, and one or two large interests are now mining a heavier tonnage than they were before the strike began. This is explained by the fact that the strike is still curbing production in some districts more removed from the immediate Pittsburgh territory. Producers generally are now able to fill all orders without delay and there is no talk of premium prices. The coke market has never been affected by the strike and is even duller than it was in June. Foundry coke is still quotable at $3.25 to $3.50, Connellsville, and the furnace grade at $2.40.

TUBULAR GOODS

The Atlantic Refining Co. is reported to have placed 180 miles of 10¾-in. seamless tubing, requiring about 15,000 tons of steel, with a local producer. The pipe will be laid in the east Texas fields. Otherwise, the line pipe market is quiet, and prospective tonnage is less active. Only one or two projects, which mills feel certain will come out this season, remain to be placed. A fair amount of feeder lines for projects begun last year is still coming to local producers, but this is far from sufficient to keep present capacity occupied. Lapweld pipe is still very dull, and buttweld material is moving only in small lots. Oil country casing is comparatively quiet, and mechanical tubing has been affected by declining operations in the automobile industry.

OLD MATERIAL

Purchase of a substantial tonnage of No. 1 heavy melting steel by a large consumer in the district at $11 has advanced the price of scrap for the second time this month. Although this consumer ordinarily takes a grade of scrap which commands a premium over ordinary material, the market may be considered at least 25c. a ton stronger, with an average price of $10.50. Dealers are still able to pick up some material at $10 and $10.25, but some are paying as high as $10.50 for scrap to lay down in their yards. Compressed sheet steel is also stronger, although no sales into consumption are reported in the last week. Both of the two heavy tonnage scrap products are rather scarce, and dealers are not rather scarce, and dealers are not anxious to make commitments. The other grades are rather quiet, although some activity continues in the market for blast furnace material. Dealers are shipping against contracts at two or three points, and there is a ready market for all surplus. No consumer purchases have been made recently to establish the market.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$10.00 to $11.00
No. 2 heavy melting steel	9.50 to 10.00
Scrap rails	10.00 to 10.50
Compressed sheet steel	10.00 to 10.50
Bundled sheets, sides and ends	8.50 to 9.00
Cast iron carwheels	10.50 to 11.00
Sheet bar crops, ordinary	11.00 to 11.50
Heavy breakable cast	8.00 to 8.50
No. 2 railroad wrought	10.00 to 10.50
Hvy. steel axle turnings	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	12.75 to 13.25
Railr. coil and leaf springs	12.75 to 13.25
Rolled steel wheels	12.75 to 13.25
Low phos. billet and bloom ends	14.50 to 15.00
Low phos. mill plates	12.00 to 12.50
Low phos. light grades	12.00 to 12.50
Low phos. sheet bar crops	13.00 to 13.50
Heavy steel axle turnings	9.00 to 9.50
Electric Furnace Grades:	
Low phos. punchings	13.50 to 14.00
Heavy steel axle turnings	9.00 to 9.50
Blast Furnace Grades:	
Short shoveling steel turnings	6.75 to 7.25
Short mixed borings and turnings	6.75 to 7.25
Cast iron borings	6.75 to 7.25
Rolling Mill Grades:	
Steel car axles	16.50 to 17.50
Cupola Grades:	
No. 1 cast	10.00 to 11.00
Rails 3 ft. and under	12.50 to 13.00

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	3.10c.
Squares and flats	3.60c.
Bands	2.95c.
Hoops	3.95c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.05c.
Galv. sheets (No. 24), 25 or more bundles	3.40c.
Hot-rolled sheets (No. 10)	3.10c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	3.74c.
Spikes, large	2.65c.
Small	2.90c. to 3.05c.
Boat	3.15c.
Track bolts, all sizes, per 100 count,	60 and 10 per cent off list
Machine bolts, 100 count,	60 and 10 per cent off list
Carriage bolts, 100 count,	60 and 10 per cent off list
Nuts, all styles, 100 count,	60 and 10 per cent off list
Large rivets, base per 100 lb	$3.20
Wire, black, soft ann'l'd, base per 100 lb.	2.30
Wire, galv. soft, base per 100 lb.	2.75
Common wire nails, per keg	2.05
Cement coated nails, per keg	2.05

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lb.

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Members of the Electric Hoist Manufacturers Association report that the number of hoists ordered during June decreased 27.7 per cent, compared with the previous month, and the value of such orders decreased 25 per cent. Shipments were 4.6 per cent greater in June than in May.

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Richard A. Parker, consulting engineer, announces the removal of his office from 911 Equitable Building to 120 Franklin Street, Denver, Colo.

CHICAGO

No Definite Trend Yet Away from Low Point of Steel Demand

CHICAGO, July 14.—Such gains as have been made recently in steel demand cannot be taken as indicating a definite trend away from the low point reached during the first week in the month. Orders for reinforcing bars, particularly for use in road work, and plates for pipe and tank manufacture, have grown a trifle, as gaged by shipments, but the bulk of steel mill products, as well as merchant pig iron and scrap, are moving sluggishly under the combined influences of the time of year and unfavorable business conditions.

Ingot operations range from 30 to 35 per cent of capacity. Were it possible to compute the exact percentage, it would in all probability exceed very slightly the figure of a week ago. The leading producer has brought its Joliet stack into service and is now using five of 27 blast furnaces. The count of active steel mill blast furnaces now totals 10 for the district.

Sales of finished steel are light, considering that there was little tonnage purchased ahead for the third quarter, and specifications are unusually spotty and are of such character that roll changes are frequent. Low stocks in the hands of consumers result in almost constant pressure against mills for early delivery of even very small lots of steel. The same situation prevails as to some manufacturing concerns, which, even though closed down temporarily, have had to start up a few machines to care for rush orders that otherwise would be canceled.

Shipments of coking coal to this district are on the increase, this being a measure to safeguard supplies at steel mills and at independent coke ovens.

FERROALLOYS

This market is quiet, especially in so far as it is affected by demand from steel foundries that are operating near the low point of the depression period.

COKE

Shipments of by-product foundry coke have slowed materially, and releases are near the low point of the year. Prices remain steady at $7.50 a ton, local ovens. Because of the uncertainty of the trend of strike moves in coal fields, coke producers are increasing their acceptances of coking coal.

PIG IRON

New buying in Northern foundry iron is possibly a shade heavier than at the turn of the month, but it is still far from satisfactory if an attempt is made to measure bookings in terms of what is normally considered a buying movement. Shipments are small and cannot be appraised above the lowest rate at any previous time this year. Three merchant stacks are in blast, but the output at each unit has been scaled down as much as is practicable. The charcoal iron market is quiet, with sales confined to a carload here and there. Only one charcoal furnace is in blast. Demand for Southern iron is sluggish in this market, but prices are well established at $11 a ton, Birmingham.

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Orders for reinforcing bars and plates for tank manufacture gain slightly, but no general improvement in buying is noted.

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Ingot operations for district range from 30 to 35 per cent of capacity. One blast furnace brought back into service.

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Shipments of coking coal increased as protection against possible shortages later on.

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Scrap market, virtually dormant, gives no sign of recovery from low prices.

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Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25		$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75		18.00
Malleable, not over 2.25 sil.		17.50
High phosphorus		17.50
Lake Super. charcoal, sil. 1.50	$25.04 to	27.04
S'th'n No. 2 fdy.		17.01
Low phos., sil. 1 to 2, copper free	28.50 to	29.20
Silvery, sil. 8 per cent	24.79 to	26.79
Bess. ferrosilicon, 14-15 per cent		35.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including an average switching charge of 61c. per gross ton.

RAILS AND TRACK SUPPLIES

Sales of both rails and fastenings are unusually small in this district. A secondary buying movement has not materialized. The third quarter started with fair-sized tonnages still unrolled, but specifications remain light. Output of standard-section rails is at about 25 per cent of capacity, with rolling schedules uncertain from week to week. The Norfolk & Western has ordered 15,000 tons of rails from Carnegie and 5000 tons from Bethlehem. Strikes in mining centers and the fact that this is normally a quiet time of the year leave the light rail market in a dull state.

WAREHOUSE BUSINESS

Orders, both as to number and size, have shown a slight increase in recent days. It is too early to construe the meaning of this, though it may represent a rebound from the low state of warehouse business just prior to and during the holiday week.

COLD-ROLLED STRIP

Shipping instructions are few and usually for small tonnages. Output for the country as a whole is at about 19 per cent of capacity, which is a gain of about three points from the holiday recession. Prices are holding.

CAST IRON PIPE

Outstanding in this week's business is distribution among a number of foundries of 5700 tons of 8, 10 and 12-in. pipe by Chicago. Altoona, Iowa, has ordered 100 tons, and it is reported here that R. D. Wood & Co. are low bidder on 180 tons of 4 to 10-in. pipe at Fond du Lac, Wis. A Des Moines, Iowa, contractor will buy 250 tons of pipe for sewage disposal plants at North Chicago, Ill., and nearby towns along the Lake shore north of Chicago. Plans are out on the Calumet sewage treating plant, but bidders have not yet had time to take off the pipe tonnage. A few small contractors' jobs have recently been placed and there is a fair amount of tonnage moving in carloads and less. However, the market is quiet, being at the moment at about the low point of the year.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $42 to $44; 4-in., $45 to $47; Class A and gas pipe, $3 extra.

SHEETS

New buying is sluggish. There has been no real test of the new price structure. Hot mill production is at about 40 per cent of capacity, which it appears is not a measure of current consumption for the reason that many users were inclined to speculate at the time of the price change and they are now taking out tonnages over and above actual requirements. Distribution by warehouses is slow, but container manufacturers are still making fair use of sheets, as are some small manufacturing plants. Use of sheets by the roofing trade has been small, but this is usually a dull time of the year. This industry usually begins to take larger quantities in early August, as it swings into heavier production to meet the fall trade. However, the roofing industry did not strike a normal stride this spring and, with building lagging, there is doubt in the minds of some as to

whether down spout and conductor pipe manufacturers will take many chances on the course of their business in the early fall months.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.40c. to 2.50c.; No. 24 galv., 2.95c. to 3.05c.; No. 10 blue ann'l'd, 2.00c. to 2.10c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

WIRE PRODUCTS

Little more can be said of this market than that it is drifting through what is normally a dull period. Sales effort is low; many salesmen are on vacations and interest in almost all directions is at the minimum. With the copper market less stable, consumer interest in copper wire is dragging. Most of the tonnage of reinforcing mesh needed on current road programs is on producers' books, and sales are not expected to reach heavy volume during the remainder of the paving season. However, shipments of mesh will be in good volume during the next two or three months. Demand for nails is in keeping with the slow building program. The use of wire and wire products in both manufacturing and rural districts is at the lowest point of the year.

PLATES

Consumer interest seems to be running higher in plates than in the other heavy tonnage products. An order for 2500 tons of plates for storage tanks has been placed, and new projects make this market more promising than it has been in three or four months. The Pittsburgh Steamship Co. will use 900 tons for repairs to two boats, and a round tonnage of plates will be needed for 100 tanks recently ordered by the Union Tank Car Co. A Western car builder has ordered out 2500 tons of car material for the Fruit Growers Express cars. No inkling is to be had as to any plans that Western railroads have for car purchases either at this time or in the near future. There is still a round tonnage of skelp moving from local steel mills. These rolling schedules are well arranged for the next few weeks, but beyond that the outlook is uncertain. Prices for plates are steady in this market.

STRUCTURAL MATERIAL

Structural awards, at about 4000 tons, are rather light in view of the fact that they are scattered over a very wide territory. Fresh inquiries total more than 6000 tons, with much of this tonnage representing new highway bridge work in States west of the Mississippi River. In Chicago the center of interest is public work such as the Post Office and bridge and viaduct work at the mouth of the Chicago River. Prices for plain material are less stable than earlier in the summer.

BARS

Demand for bars continues to drop as the needs of automobile manufacturers decline. Mild steel bar mills in this district are producing at about 35 per cent of capacity, but a large part of the output is for concrete reinforcement. Use of alloy steel bars is comparatively light except here and there as at the Nash plants and at the Plymouth plant, where fair schedules are being maintained. The iron bar market is extremely dull, with little prospect of a change in the near future. Rail steel bar mills are producing at 40 per cent of capacity. Orders are small and roll changes are frequent to meet the exacting needs of buyers. Prices are steady at 1.60c. to 1.65c. a lb., local mill.

BOLTS, NUTS AND RIVETS

Several local producers, whose plants have been down for inventories and vacations, have resumed production on a small scale. Because of the character of orders, which call for many specialties, it was found during the shutdown period that a few operators had to be called back and certain machines started to avoid cancellation because of rigid time limits on deliveries. Although spot sales are small, there are indications that the new prices are holding better than was the case with the old quotations.

REINFORCING BARS

Inquiries for building work now total close to 8000 tons, which represents quite a change from the spring, when shops were subsisting almost wholly on road work. The latter is still an important market factor. In the past several weeks not less than 2500 tons of rail steel bars have been ordered for road slab and bridge work and there is still a round tonnage to be placed. Road builders are busy and their releases form one of the brightest spots in this market. The price situation is not improving. In fact, in some directions, particularly to the east of Chicago and in Minnesota, quotations have sagged to new lows.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforcing bars, billet steel	1.55c. to 2.00c.
Rail steel reinforcement—	
For buildings	1.45c. to 1.65c.
Highway slabs	1.50c.
For bridges and culverts	1.65c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.10c.
Flats and squares	3.60c.
Bands, $\frac{1}{4}$ in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galv. sheets (No. 24)	4.10c.
Hot-rolled sheets (No. 10)	3.20c.
Spikes ($\frac{1}{2}$ in. and larger)	3.45c.
Track bolts	4.30c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60, 10 and 10
Carriage bolts	60, 10 and 10
Coach and lag screws	60, 10 and 10
Hot-pressed nuts, sq., tap. or blank,	60, 10 and 10
Hot-pressed nuts, hex., tap. or blank,	60, 10 and 10

No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

OLD MATERIAL

Tests of prices are lacking as buying comes to a standstill. With steel mills producing only a shade above 30 per cent of ingot capacity, the movement of heavy melting steel to consumers is light and the urge to make additional purchases is lacking. Melters of miscellaneous grades are in a like position and their lack of needs is contributing to the stagnation of the market. The situation as to consumption is helpful to dealers, who are anxious to work away from short positions, for the reason that supplies are somewhat more plentiful and coverage is easier at prices that are in line with contracts on hand. Opinion is divided as to the course of the market. Some are still clinging to the recent action of the Pittsburgh market as an indication of what will occur here. Others see little in prospect for 30 to 60 days. The Chicago & Alton is advertising a small list and the Wabash will sell 1500 tons.

Prices del'd Chicago dist. consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$8.50 to	$9.00
Shoveling steel	8.50 to	9.00
Frogs, switches and guards, cut apart, and misc. rails	8.50 to	9.00
Factory hyd. comp. sheets	7.00 to	7.50
Drop forge flashings	6.00 to	6.50
No. 1 busheling	6.75 to	7.25
Forg'd cast and r'l'd steel carwheels	9.50 to	10.50
Railroad tires, charg. box size	10.50 to	11.00
Railroad leaf springs cut apart	11.00 to	11.50
Axle turnings	7.00 to	7.50
Acid Open-Hearth Grades:		
Steel couplers and knuckles	9.75 to	10.25
Coil springs	11.50 to	12.00
Electric Furnace Grades:		
Axle turnings	7.50 to	8.00
Low phos. punchings	10.75 to	11.25
Low phos. plates, 12 in. and under	10.50 to	11.00
Blast Furnace Grades:		
Cast iron borings	3.75 to	4.00
Short shoveling turnings	3.50 to	4.00
Machine shop turnings	3.50 to	4.00
Rolling Mill Grades:		
Rerolling rails	10.25 to	10.75
Cupola Grades:		
Steel rails, less than 3 ft.	10.50 to	11.00
Steel rails, less than 2 ft.	11.00 to	11.50
Angle bars, steel	9.25 to	9.75
Cast iron carwheels	10.00 to	10.50
Malleable Grades:		
Railroad	9.50 to	10.00
Agricultural	9.00 to	9.25
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	19.00 to	21.00
*Relaying rails, 65 lb. and heavier	22.00 to	27.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angle and splice bars	9.00 to	9.50
Iron arch bars and transoms	10.50 to	11.00
Iron car axles	17.50 to	18.50
Steel car axles	11.50 to	12.00
No. 1 railroad wrought	7.00 to	7.50
No. 2 railroad wrought	7.50 to	8.00
No. 1 busheling	6.00 to	6.50
No. 2 busheling	4.00 to	4.50
Locomotive tires, smooth	11.50 to	12.50
Pipes and flues	5.50 to	6.00
Cupola Grades:		
No. 1 machinery cast	9.00 to	9.50
No. 1 railroad cast	8.00 to	8.50
No. 1 agricultural cast	7.00 to	7.50
Stove plate	6.25 to	6.75
Grate bars	5.50 to	6.00
Brake shoes	5.75 to	6.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

CLEVELAND

Rate of Steel Operations Unchanged But Current Demand Tapers

CLEVELAND, July 14.—With demand lighter for all forms of finished steel than in June, the steel industry is now feeling the effects of the summer lull. Some metal-working plants are shut down for vacations and inventories and others will suspend operations during the last two weeks of the month. Orders are for small lots and only for immediate needs. While evidence of greater activity on the part of consuming industries is lacking, there is much improvement in sentiment and the belief is quite general that the early fall will show quite an uptrend in business.

Steel plant operations in Cleveland are unchanged at 35 per cent of ingot capacity. However it is probable that this will be reduced before the end of the week. Operations of sheet and hot-strip mills in this territory were curtailed this week, some of the mills having exhausted orders taken at the lower prices at the end of June.

Attempts to establish prices on steel bars, plates and shapes at 1.65c., Pittsburgh, for the third quarter have not yet been successful. For larger buyers the 1.60c. price is being mentioned, but 1.65c. is certainly still in effect for small lots of going business. Cleveland has been made a basing point for plates for railroads only, with a 1.65c., Cleveland, base. This change evidently is because plates are made in Cleveland.

The Cleveland bar price is unchanged at 1.65c. for outside shipment and 1.70c. for local delivery. The latter for some time has been the delivered price but an attempt will be made to restore a 2½c. switching charge, although this will not affect consumers who have placed 1.70c. contracts. While some third quarter contracts have been taken at 1.65c., Pittsburgh, for the three products, some shading has been reported on plates and shapes for specific jobs.

PIG IRON

The market continues more active than during the spring and early summer, although tonnage sold the past week was not so large as during the previous week. Several good-sized contracts, mostly for foundry iron, were placed in lots up to 1000 tons. A Dayton, Ohio, consumer expects to close today for a 1000-ton lot. A central Ohio foundry is in the market for 1000 tons, and among inquiries are two for 1500 tons, one from Michigan and the other from Indiana. Most contracts are for the third quarter, although some foundries are buying for the remainder of the year. Practically none of the business is coming from foundries affiliated with the motor car industry. Shipments so far this month have been lighter than in June. Prices are steady, with little apparent pressure by buyers to secure concessions. Foundry and malleable iron are quoted at $16 to $17, Lake furnace, for Ohio and Indiana, $17 to $17.50 for Michigan shipment, and $17, Cleveland, for local delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$17.00
S'th'n fdy., sil. 1.75 to 2.25	17.01
Malleable	17.50
Ohio silvery, 8 per cent	25.00
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

IRON ORE

Dock stocks of Lake Superior ore on July 1 at Lake Erie ports amounted to 5,156,692 tons, compared with 4,612,638 tons on the same date a year ago. With light movement down the Lakes, there was upward of 600,000 tons less ore on docks on July 1 than on April 1. Receipts at Lake Erie ports during June were 2,369,113 tons and for the season to July 1, 2,977,281 tons, against 9,751,797 tons for the same period last year. June shipments from these docks were 1,891,473 tons and for the season to July 1, 3,016,358 tons, against 8,122,255 tons for the same period last year. Receipts at other than Lake Erie ports to July 1 were 2,189,740 tons, against 4,797,358 tons for the same period a year ago.

SHEETS

With the early needs of consumers taken care of by specifications placed at the old prices before July 1, the market is very dull. However, some small-lot business was placed during the week at the new prices, which are being maintained, although they have not yet been tested by round-lot sales. Some carlot business in galvanized sheets came from the building industry at 2.90c., Pittsburgh, or $5 a ton below the recent minimum. A leading Eastern oil refining interest, which recently inquired for 50,000 steel barrels requiring 2500 tons of sheets, has placed this business, 90 per cent of it going to an Erie, Pa., barrel manufacturer. Tonnage from motor car and refrigerator industries is tapering off. Mill operations were reduced this week, following the increase made possible by orders placed at the end of June.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex	3.10c.
Cold-fin. flats and sq.	3.60c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.00c.
Hoops and bands, No. 13 and lighter	3.55c.
Cold-finished strip	*5.55c.
Hot-rolled annealed sheets (No. 24)	3.60c.
Galvanized sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10)	3.00c.
No. 9 ann'l'd wire, per 100 lb.	$2.25
No. 9 galv. wire, per 100 lb.	2.70
Com. wire nails, base per keg	2.10

*Net base, including boxing and cutting to length.

STRIP STEEL

There has been little business in hot-rolled strip since the price advance July 1 to 1.55c., Pittsburgh, for wide and 1.65c. for narrow strip, but the higher prices appear to be holding. Not many consumers have placed contracts for the quarter. Little test of the market is expected this month. Cold-rolled strip is holding at 2.15c., Cleveland.

BARS, PLATES AND SHAPES

Demand for steel bars is very light. Little tonnage is coming from the motor car industry. Three hundred tons of reinforcing bars were placed during the week for a Cleveland bridge. Few structural lettings are reported in this territory and there is little new inquiry. The 2500 tons of plates for Belvoir Boulevard pipe line have not yet been placed. A Pittsburgh mill has taken 300 tons of sheet steel piling for mooring basin in Toledo.

OLD MATERIAL

One Cleveland mill purchased 2500 tons of No. 1 heavy melting steel during the week at a reported price of $9.75 for selected scrap and another bought 1000 tons of borings and turnings at $7. Prices show no firmer tendency. Local independent mills are taking no dealers' scrap this week. There is a limited amount of business in scrap for delivery to Valley district mills, dealers paying $10 to $10.25 for No. 1 heavy melting steel, $9.50 to $10 for bundled sheet scrap and $7 and $7.25 for machine shop turnings. Local yard dealers are paying only $6.50 to $7 for No. 1 heavy melting steel in truck loads, delivered.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$8.50 to	$9.00
No. 2 heavy melting steel	8.00 to	8.50
Compressed sheet steel	7.50 to	8.00
Light bundled sheet stampings	6.50 to	7.00
Drop forge flashings	6.75 to	7.00
Machine-shop turnings	5.00 to	5.50
Short shoveling turnings	6.25 to	6.75
No. 1 railroad wrought	9.50 to	10.00
No. 2 railroad wrought	10.00 to	10.50
No. 1 busheling	6.75 to	7.00
Pipes and flues	5.50 to	6.00
Steel axle turnings	7.50 to	8.00
Acid Open-Hearth Grades:		
Low phos., billet bloom and slab crops	14.00 to	14.50
Blast Furnace Grades:		
Cast iron borings	6.00 to	6.25
Mixed borings and short turnings	6.00 to	6.25
No. 2 busheling		5.75
Cupola Grades:		
No. 1 cast	10.00 to	10.50
Railroad grate bars	6.00 to	6.50
Stove plate	6.00 to	6.50
Rails under 3 ft.	15.00 to	15.50
Miscellaneous:		
Rails for rolling	13.00 to	13.50
Railroad malleable	11.00 to	11.25

NEW YORK

Pig Iron Inquiry Improves Slightly—Little or No Gain in Steel

NEW YORK, July 14.—Interest in pig iron shows a slight improvement over the previous week, prospective business in the local territory amounting to about 3500 tons. The A. P. Smith Mfg. Co., East Orange, N. J., is in the market for 750 tons of No. 2X and No. 2 plain for third and fourth quarter delivery, and another local melter is inquiring for 1000 tons of iron, silicon 2.75 to 3.25 per cent, for barge delivery during third quarter. Sales for the week amounted to 5000 tons, compared with 7600 tons the week previous. Some weakness in prices is indicated on desirable tonnages, but schedules are fairly well maintained on average lots. Southern iron for Northern delivery is held firmly at $11, Birmingham.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$19.91 to $20.41
*Buff. No. 2, del'd east. N. J.	18.28 to 18.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	17.39 to 17.89
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	17.89 to 18.39

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

FINISHED STEEL

With sheet and strip mills apparently maintaining a firm attitude on prices, there is, on the other hand, a slight easing in quotations on the heavy hot-rolled products, especially bars and plates. There is not so much insistence on 1.65c., Pittsburgh, on bars, though this price applies on the average run of small orders. Plates are quoted at 1.75c., Coatesville, on the ordinary run of current small orders, but on anything attractive 1.70c. is now quite common.

Steel companies' sales offices find evidences of better sentiment, but not much actual improvement in tonnage, although orders the past week were generally a little larger than those of the preceding week, which was affected by the holiday. The German financial crisis brings a new element of uncertainty, though steel people do not know how to construe its probable effect on domestic business.

CAST IRON PIPE

Open inquiry for pressure pipe is limited. LeRoy, N. Y., will open bids next week on 500 tons of 6 to 16-in. and Southampton, Mass., will take bids July 22 on 400 tons of 6 and 8-in. A sizable tonnage is in prospect for a water supply system to be installed by the State of New York, to serve several towns near Racquette and Long Lakes, specifications for which are expected to be ready next month. Borough of Queens awarded 1340 tons of 20-in. to an unnamed maker, and Remsen, N. Y., placed 200 tons of small sizes with R. D. Wood & Co. Borough of Bronx awarded several hundred tons of 20-in. and larger sizes, and the United States Navy placed 100 tons of 48-in., both contracts going to Warren Foundry & Pipe Corpn. Prices are unchanged.

Prices per net ton delivered New York: Water pipe, 6-in. and larger, $32.90; 4-in. and 5-in., $35.90; 3-in., $42.90. Class A and gas pipe, $3 extra.

REINFORCING BARS

Quotations continue at 1.60c. a lb., Pittsburgh, or 1.93c., New York, for small tonnages of billet steel bars, and concessions of $1 and more a ton are outstanding on current projects calling for upward of 100 tons. In an effort to stabilize the market at a minimum of 1.60c., Pittsburgh, certain mills have informed distributers that business taken at concessions will not be accepted at any lower price by the mill. New reinforced concrete projects in this district include 160 tons for 18 small buildings at Mitchel Field, Long Island.

OLD MATERIAL

Brokers are encountering increasing resistance to sales by holders of scrap at the present prices. One broker who is loading barges with No. 1 and No. 2 heavy melting steel has previously had no difficulty in obtaining from 100 to 150 tons of material daily. In the past week, daily loadings dropped below 100 tons. Shipments of No. 1 steel to eastern Pennsylvania are limited to occasional carloads, with brokers offering only $8 a ton, delivered on a freight rate of $2.41 a ton, compared with $6.25 paid for the same grade, loaded on barges in New York. Stove plate for foundries is quotable at $6.50 to $6.75 a ton, delivered, but brokers have recently offered up to $7, delivered, to obtain sufficient supplies to complete existing contracts. At the same time consumers show no interest in buying more than a few carloads of material at a time.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel..	$4.50 to	$6.25
Heavy melting steel (yard)	3.00 to	3.50
No. 1 hvy. breakable cast..	5.50 to	6.00
Stove plate (steel works)..	3.75 to	4.00
Locomotive grate bars....	3.75 to	4.00
Machine shop turnings....		2.00
Short shoveling turnings...		2.00
Cast borings (blast fur. or steel works)		2.25
Mixed borings and turnings	1.75 to	2.00
Steel car axles	12.00 to	12.50
Iron car axles	16.50 to	17.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	6.00 to	6.25
Forge fire		4.50
No. 1 railroad wrought....		8.25
No. 1 yard wrought, long..		7.25
Rails for rolling	6.00 to	6.50
Stove plate (foundry)....	4.25 to	4.75
Malleable cast (railroad)..	7.50 to	8.00
Cast borings (chemical)..	8.00 to	8.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$11.50 to	$12.00
No. 1 hvy. cast (columns, bldg. materials, etc.; cupola size)	9.50 to	10.00
No. 2 cast (radiators, cast boilers, etc.)	8.50 to	9.00

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Hot-rolled sheets (No. 10)	3.00c. to 3.25c.
Hot-rolled ann'l'd sheets (No. 24*)	3.50c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10
Boiler Tubes:	**Per 100 Ft.**
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

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The Second International Heating and Ventilating Exposition will be held in Cleveland, Jan. 25-29, 1932, in conjunction with the annual meetings of the American Society of Heating and Ventilating Engineers and the American Society of Refrigerating Engineers. The show is in charge of the International Exposition Co., Grand Central Palace, New York.

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Jessop Steel Co., Washington, Pa., is installing another electric melting furnace, two new annealing furnaces, a 3-ton forging hammer and extending its present buildings to take care of these improvements.

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Production of galvanized sheet metal ware in May totaled 121,413 doz. pieces, against 143,258 doz. in April, according to reports received by the Bureau of the Census from 13 establishments.

PHILADELPHIA

Steel Mill Operations Down—Large Gas Holders Placed

PHILADELPHIA, July 14.—Steel buying has receded slightly, and mill operations in eastern Pennsylvania are at about 32 per cent of capacity. The new sheet prices are maintained in the absence of an actual test, but concessions of $1 a ton appear on desirable orders for plates and shapes. Despite lack of substantial business, sentiment continues to be hopeful.

Two 10,000,000 cu. ft. gas holders, each requiring about 3000 tons of plates and 1000 tons of shapes, have been placed by the United Gas Improvement Co. with the Bartlett Hayward Co. and the McClintic-Marshall Corpn. Fabricators are bidding on six tank heads, 86 ft. in diameter, requiring a total of about 250 tons of plates. Among the larger structural steel projects is about 2000 tons for a pedestrian concourse at Twelfth and Walnut Streets, Philadelphia. The Norfolk & Western Railroad has allocated 20,000 tons of rails, of which 15,000 tons went to the leading interest and 5000 tons to the leading independent.

PIG IRON

Except for certain consumers who have covered their requirements for the next two months or more by purchases of 150 to 250 tons of foundry iron, buying is generally limited to carload lots at $16.25 to $16.50 a ton, furnace. Southern foundry iron is still quoted at $11 a ton, Birmingham, but buyers suggest that a medium-sized tonnage could be placed in the South at a slight concession. About two large cargoes of foundry iron a week are arriving for consumers in this district, especially pipe makers, from northern New York and New England producers. At a second opening of bids by the Washington Navy Yard on 224 tons of low phosphorus iron, the low bid was $22.75, delivered, for foreign iron, with the lowest domestic offer, $25.15, delivered, for copper-bearing low phosphorus.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$17.01 to $17.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	17.51 to 17.76
East. Pa. No. 1X	18.01 to 18.26
Basic (del'd east. Pa.)	16.75
Malleable	19.00 to 20.00
Stand. low phos. (f.o.b. east. Pa. furnace)	23.00 to 24.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 23.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

STEEL BARS

Quotations are unchanged at 1.60c. to 1.65c. a lb., Pittsburgh, or 1.89c. to 1.94c., delivered Philadelphia. Buying is rather generally of carload lots and considerably smaller tonnages. Billet steel reinforcing bars are generally quoted at 1.60c., Pittsburgh, or 1.89c., Philadelphia, for lots of considerably under a carload, but concessions of $1 and $2 a ton are not uncommon on the larger projects. Rail steel bars range from 1.20c. to 1.30c. a lb., Pittsburgh, or 1.49c. to 1.59c., Philadelphia. Recent awards of reinforcing bars include about 300 tons placed for a large gas holder in Washington.

SHAPES

Business is limited to small lots, on which 1.70c., f.o.b. nearest mill to consumer, or 1.76c., Philadelphia, usually applies, with concessions of $1 a ton on the larger lots. Local fabricators are bidding on a number of small structural steel projects, including two apartment buildings, a school, small factory buildings and stores.

PLATES

While the number of orders being booked by eastern Pennsylvania plate mills is unchanged, the individual tonnages are somewhat smaller. On most current business the quotation continues at 1.75c., f.o.b. Coatesville, Pa., or 1.85½c., Philadelphia, but on the more desirable contracts concessions of $1 a ton are granted. Fabricators of tanks and boilers are continuing to furnish a fair tonnage of small specifications.

SHEETS

The new classification and bases on sheets is still generally untested by actual consumer buying of carload lots or more. Small orders for galvanized sheets, however, have been placed on the new basis of 2.90c., Pittsburgh, or 3.19c., Philadelphia. Buying of hot-rolled sheets has not developed since July 1, but a fair-sized tonnage is under negotiation in this district with one consumer, and its award may determine the firmness of the new price schedule.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c.
Structural shapes	2.50c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Reinforc. steel bars, sq., twisted and deform.	2.30c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.15c.
Steel bands, No. 12 to ⅛-in. inclu.	2.90c.
Spring steel	5.00c.
Hot rolled, box annealed sheets (No. 24)	3.40c.
Galvanized sheets (No. 24)	3.85c.
Hot rolled blue annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, ¼-in.	5.20c.
Swedish iron bars	6.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

IMPORTS

In the week ended July 11, 100 tons of ferromanganese was received at this port from Germany. Steel arrivals consisted of 37 tons of structural shapes from Belgium, five tons of galvanized steel strip from England and five tons of drill steel from Sweden.

OLD MATERIAL

Buying is still limited to small lots of special grades of scrap. Prices show no tendency to advance in the absence of large tonnage contracting. Machine shop turnings and No. 2 heavy melting steel are moving to the consumer at Phoenixville, Pa., and occasional carload lots of No. 1 heavy melting steel are being shipped to the Claymont, Del., user of this grade.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$8.00 to $8.50
No. 2 heavy melting steel	7.00
No. 1 railroad wrought	10.00 to 10.50
Bundled sheets (for steel works)	6.50
Hydraulic compressed, new	7.06 to 7.50
Hydraulic compressed, old	6.00 to 6.50
Machine shop turnings (for steel works)	5.00 to 6.00
Heavy axle turnings (or equiv.)	8.00 to 8.50
Cast borings (for steel works and roll. mill)	5.00 to 6.00
Heavy breakable cast (for steel works)	9.50 to 10.00
Railroad grate bars	8.00
Stove plate (for steel works)	8.00
No. 1 low phos., hvy. (0.04% and under)	12.00 to 13.00
Couplers and knuckles	11.00 to 11.50
Rolled steel wheels	10.00 to 11.00
No. 1 blast furnace	5.50
Wrot. iron and soft steel pipe and tubes (new specific.)	10.50 to 11.00
Shafting	16.50 to 17.00
Steel axles	16.00 to 16.50
No. 1 forge fire	8.00 to 8.50
Cast iron carwheels	12.00 to 12.50
No. 1 cast	11.00 to 11.50
Cast borings (for chem. plant)	12.00 to 12.50
Steel rails for rolling	10.50 to 11.00

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Detroit Scrap Market Quiet But Firm

DETROIT, July 14.—Despite the fact that the scrap market has been dull, with only scattered buying, prices are firm and unchanged. Curtailed operations of plants in the automotive industry have resulted in low production of scrap. Local dealers expect the quietness to continue until the middle of August.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$6.75 to $7.25
Borings and short turnings	4.25 to 4.75
Long turnings	3.50 to 4.00
No. 1 machinery cast	8.00 to 8.50
Automotive cast	11.00 to 11.50
Hydraul. comp. sheets	6.75 to 7.25
Stove plate	5.50 to 6.00
New No. 1 busheling	5.50 to 6.00
Old No. 2 busheling	2.50 to 3.00
Sheet clippings	3.75 to 4.25
Flashings	5.75 to 6.25

BOSTON

Buffalo Pig Iron Prices Easier—Scrap Market in Doldrums

BOSTON, July 14.—A recent sale of No. 2X iron to a Maine foundry at $14.75 a ton, furnace, and subsequent similar offers to other foundries by a Buffalo stack, and bookings of No. 2X at $15, furnace, by other Buffalo interests establish Buffalo iron prices as easier. Foundries say they can buy Buffalo No. 1X at $14.75 a ton, furnace, but as no sales are recorded that price is not established. It is certain, however, that Buffalo furnaces are ignoring silicon differentials. Sales the past week were a scant 1000 tons, about half those of the previous week. There are no open inquiries in the market, but two stacks are privately negotiating an aggregate of more than 1000 tons which may be closed this week.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.66 to $19.91
*Buffalo, sil. 2.25 to 2.75	19.66 to 19.91
†Buffalo, sil. 1.75 to 2.25	19.03 to 19.28
†Buffalo, sil. 2.25 to 2.75	19.03 to 19.28
*Ala., sil. 1.75 to 2.25	20.11 to 20.61
*Ala., sil. 2.25 to 2.75	20.61 to 21.11
†Ala., sil. 1.75 to 2.25	16.75
†Ala., sil. 2.25 to 2.75	17.25

Freight rates: $4.91 all rail and $4.28 rail and water from Buffalo; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

CAST IRON PIPE

NASHUA, N. H., has purchased 150 tons of Class B pipe from R. D. Wood & Co. and West Springfield, Mass., 100 tons from the Warren Foundry & Pipe Corpn. Otherwise business the past week was confined to small scattered lots. Keene, N. H., is in the market for 2700 ft. of pipe. Cast iron prices are very soft, less than $32 a ton, foundry, having been accepted the past week.

OLD MATERIAL

The scrap market is in the doldrums. Sales by leading local brokers the past week did not aggregate a dozen cars of material, and there are no indications of business improvement within the near future. The fact that prices have not declined for two or three weeks gives the impression that values are on rock bottom and that the least improvement in buying will result in increased prices. This belief is based to a large degree on the knowledge that accumulation of scrap in New England the past year probably has been less than in any similar period within the memory of the trade. That statement applies to material suitable for steel mill consumption, for there has been an accumulation of textile machinery cast, particularly within the past two months, and that material is available at prices not equaled since long before the war.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$4.00 to	$4.25
Scrap T rails	4.00 to	4.25
Scrap girder rails	3.00 to	3.25
No. 1 railroad wrought	7.00 to	7.50
Machine shop turnings	0.60 to	0.80
Cast iron borings (steel works and rolling mill)	0.60 to	1.00
Bundled skeleton, long	3.00 to	3.25
Forged flashings	5.00 to	5.25
Blast furnace borings and turnings		1.00
Forge scrap	0.50 to	0.80
Shafting	10.00 to	10.50
Steel car axles	11.00 to	12.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	5.00 to	5.25
Rails for rolling	7.50 to	8.00
Cast iron borings, chemical	7.00 to	7.25
No. 2 cast	5.00 to	5.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$9.50 to	$10.00
No. 1 machinery cast	9.50 to	10.00
Stove plate	5.00 to	5.25
Railroad malleable	13.00 to	13.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.36½c.
Structural shapes—	
Angles and beams	3.36½c.
Tees	3.36½c.
Zees	3.36½c.
Soft steel bars, small shapes	3.26½c.
Reinforcing bars	3.11½c. to 3.26½c.
Iron bars—	
Refined	3.26½c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 5.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.80c.

	Per Cent Off List
Machine bolts	65 and 5
Carriage bolts	65 and 5
Lag screws	65 and 5
Hot-pressed nuts	40 and 10
Cold-punched nuts	40 and 10
Stove bolts	70 and 10

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CINCINNATI

Lake Furnaces Reaching Out for Business in Southern Ohio

CINCINNATI, July 14.—The usual summer lull is apparent in the pig iron market. Sales during the week were about 1000 tons, all in small lots. Competition in this district has been increased by the entry of one or two Lake furnaces which heretofore had not been factors in this market. Some attractive prices have been offered. For the most part, price schedules on pig iron, particularly on Southern, have been fairly well maintained, although in the more competitive area Northern furnaces are reported to have granted concessions on silicon differentials. Local foundries are operating at a very low rate.

Prices per gross ton, deliv'd Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$14.69
Ala., fdy., sil. 2.25 to 2.75	15.19
Tenn. fdy., sil. 1.75 to 2.25	14.69
S'th'n Ohio silvery, 8 per cent	23.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

COKE

Specifications for foundry coke have eased a trifle this month, since foundries have not felt an increase in demand. New orders are small and infrequent.

FINISHED STEEL

Although orders for sheets last week were less than in the preceding week, mill operators report that the demand was better than had been expected. Mills increased their production during the past week to handle new orders, but schedules next week will be reduced.

OLD MATERIAL

The scrap market is quiet. Most mills in the district have retarded shipments, and new business is negligible. Dealers' offering prices have not been changed.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$7.25 to	$7.75
Scrap rails for melting	10.25 to	10.75
Loose sheet clipping	3.50 to	4.00
Bundled sheets	6.75 to	7.25
Cast iron borings	3.75 to	4.25
Machine shop turnings	4.00 to	4.50
No. 1 busheling	5.75 to	6.25
No. 2 busheling	3.75 to	4.25
Rails for rolling	11.00 to	11.50
No. 1 locomotive tires	9.50 to	10.00
No. 2 railroad wrought	7.25 to	7.75
Short rails	13.00 to	13.50
Cast iron carwheels	10.50 to	11.00
No. 1 machinery cast	12.50 to	13.00
No. 1 railroad cast	11.50 to	12.00
Burnt cast	5.25 to	5.75
Stove plate	5.25 to	5.75
Brake shoes	5.25 to	5.75
Agricultural malleable	10.00 to	10.50
Railroad malleable	11.00 to	11.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex	3.50c.
Squares	4.00c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot-rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	10.25

	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

ST. LOUIS

Slight Improvement in Open-Hearth Operations —Scrap Firmer

ST. LOUIS, July 14.—An improvement in the movement of basic iron, one of the East Side mills putting on an additional open-hearth furnace, was a hopeful sign of the week. Melters generally are said to be taking full schedules of pig iron against contracts, and are storing the material if the melt is insufficient to consume it as shipped. The St. Louis Gas & Coke Corpn. reports that shipments in June were 20 per cent larger than those of May. Malleable foundries, which rely on the automobile trade and the railroads, are doing very little. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	15.42
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

FINISHED MATERIAL

One of the East Side mills has put on another furnace, making four now being operated. Business in plates, shapes and bars continues quiet, with an exception in tin plate, for which the demand continues heavy. Railroads have shown no inclination yet to buy for third quarter. The Missouri Rolling Mills Corpn. has been awarded 1160 tons of columns for the Illinois Terminal Warehouse Co., leaving 3660 tons of reinforcing bars yet to be awarded on this project. The St. Louis-San Francisco Railway will buy 125 tons of reinforcing bars for grade crossing work here.

OLD MATERIAL

An East Side mill purchased a round tonnage of rails and specialties at the prices which prevailed on the preceding transaction. Shipments of scrap from the country have virtually stopped, but railroads are still selling large lots. Slightly higher prices are being paid by dealers for yard scrap in anticipation of a higher market soon and because of the low stocks in yards. There is not believed to be any large short interest in this market. No. 1 busheling and cast iron borings and shoveling turnings are 25c. a ton higher.

Railroad lists: Chesapeake & Ohio, 8407 tons; Louisville & Nashville, 5000 tons; Wabash, 1890 tons; International-Great Northern, 900 tons; Chicago & Alton, 600 tons; Nickel Plate, 32 carloads, and Nashville, Chattanooga & St. Louis, eight carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	$8.25 to	$8.75
No. 1 heavy melting or shoveling steel	8.00 to	8.50
No. 2 heavy melting or shoveling steel	7.25 to	7.75
No. 1 locomotive tires	10.00 to	10.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	9.25 to	9.75
Railroad springs	10.00 to	10.50
Bundled sheets	6.00 to	6.50
No. 2 railroad wrought	8.00 to	8.50
No. 1 busheling	6.25 to	6.75
Cast iron borings and shoveling turnings	5.25 to	5.75
Iron rails	8.00 to	8.50
Rails for rolling	10.50 to	11.00
Machine shop turnings	2.75 to	3.25
Heavy turnings	6.00 to	6.50
Steel car axles	13.50 to	14.00
Iron car axles	17.50 to	18.00
Wrot. iron bars and trans.	8.75 to	9.25
No. 1 railroad wrought	5.50 to	6.00
Steel rails, less than 3 ft.	10.50 to	11.00
Steel angle bars	8.50 to	9.00
Cast iron carwheels	7.00 to	7.50
No. 1 machinery cast	8.00 to	8.50
Railroad malleable	8.00 to	8.50
No. 1 railroad cast	8.00 to	8.50
Stove plate	7.00 to	7.50
Relay. rails, 60 lb. and under	16.00 to	16.50
Relay. rails, 70 lb. and over	20.00 to	21.00
Agricult. malleable	7.50 to	8.00

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BUFFALO

Pig Iron Buyers Showing More Interest— Scrap Tone Better

BUFFALO, July 14. — Pig iron sales the past week are estimated at 3000 to 3500 tons, with melters showing a little more interest in buying small lots. Stocks of iron are in a healthy condition, neither furnaces or consumers having any great surpluses. Most of the producers are quoting $16 on Eastern business, with some shading. The Lackawanna plant of the Bethlehem Steel Corpn. placed a second furnace in blast last week, bringing the total district operation to five.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.00
No. 2X fdy., sil. 2.25 to 2.75	17.50
No. 1 fdy., sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	25.28

FINISHED STEEL

Republic Steel Corpn. resumed operations after the holiday with one open-hearth; Lackawanna plant of the Bethlehem Steel Corpn. is operating 10 open-hearths and Wickwire Spencer three. A Buffalo structural fabricator took 100 tons for a new plant for the Oliver Gear & Machinery Co., Buffalo.

OLD MATERIAL

The market shows more activity. There are some conflicting reports of a sale of No. 2 heavy melting steel. One report is that about 1000 tons was involved, principally hydraulic bundles, No. 2 grade. Some dealers are offering as high as $7.50 for No. 2 heavy melting steel to fill old orders. Several sales of No. 1 machinery cast scrap are reported at $9.75 and a number of stove plate sales at $8. The market shows signs of an awakening interest, with inquiries for immediate and deferred delivery. Dealers believe that by the middle of August definite marks of improvement will be in evidence.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel		$9.00
No. 2 heavy melting scrap		7.50
Scrap rails	$10.00 to	10.50
Hydraul. comp. sheets		7.50
No. 2 hydraul. comp. sheets		7.00
Hand bundled sheets		7.00
Drop forge flashings		7.50
No. 1 busheling		7.50
Hvy. steel axle turnings	8.50 to	9.50
Machine shop turnings	4.50 to	5.00
No. 1 railroad wrought	7.50 to	8.00
Acid Open-Hearth Grades:		
Knuckles and couplers	12.00 to	12.50
Coil and leaf springs	12.00 to	12.50
Rolled steel wheels	12.00 to	12.50
Low phos. billet and bloom ends	13.00 to	14.00
Electric Furnace Grades:		
Short shov. steel turnings	6.00 to	6.50
Blast Furnace Grades:		
Short mixed borings and turnings	6.00 to	6.50
Cast iron borings	6.00 to	6.50
No. 2 busheling	4.50 to	5.00
Rolling Mill Grades:		
Steel car axles	15.00 to	15.50
Iron axles	16.00 to	16.50
Cupola Grades:		
No. 1 machinery cast	9.75 to	10.00
Stove plate	8.00 to	8.25
Locomotive grate bars	7.00 to	7.50
Steel rails, 3 ft. and under	13.00 to	13.50
Cast iron carwheels	11.50 to	12.00
Malleable Grades:		
Industrial	10.00 to	10.50
Railroad	10.00 to	10.50
Agricultural	10.00 to	10.50
Special Grades:		
Chemical borings	9.00 to	9.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.65c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.10c.
Bands	3.35c.
Hoops	3.90c.
Hot-rolled sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.20

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.15c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.35c.
Hot-rolled annealed sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Hot-rolled sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	3.85c.
Galv. corrug. sheets	4.40c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60 and 10
Carriage bolts	60 and 10
Lag screws	60 and 10
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60 and 10
Less than 200 lb.	50 and 10
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60 and 10
Less than 200 lb.	50 and 10

BIRMINGHAM

Ensley Rail Mill to Be Shut Down July 22

BIRMINGHAM, July 14.—Pig iron orders are irregular and largely on a spot basis. Shipments seem to be more restricted than in June. Quotations for the district continue at $12 to $13. Twelve furnaces are still in blast, the same as for the past three weeks. There is talk of curtailment, but nothing definite has developed.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$12.00 to $13.00
No. 1 fdy., 2.25 to 2.75 sil.	12.50 to 13.50
Basic	12.00 to 13.00

CAST IRON PIPE

New tonnage of the past week was mostly in small lots and did not show much of an improvement over that of the preceding week. A number of awards are pending, and it is expected that some sizable business will be booked before the end of the month. National Cast Iron Pipe Co. secured 500 tons from San Francisco. Plant operations remain at about 50 per cent. Quotations are on a nominal base of $35 to $36.

FINISHED STEEL

The stronger sheet demand of late June, due mostly to price advances, has eased off since the first of the month. Shipments this month will be better, as forward business booked in June at the old prices has a delivery limit of July 31. New tonnage in other lines has been only fair. Fabricators of structural steel and reinforcing bars had an ordinary week. Rail mill operations of the Tennessee company at Ensley are to be stopped about July 22, and this will mean a curtailment also of furnace and open-hearth operations at Ensley. Open-hearth operations of the Tennessee company were slightly better last week. Twelve open-hearths were operated a part of the week, compared with 10 the preceding week. Gulf States Steel continues with two active open-hearths.

OLD MATERIAL

The market is dragging, with sales scattered and light. Several inquiries were received last week for fair tonnages, but this business has not yet been placed. Scrap steel rails are off $1 to $9; short shoveling turnings are lower at $6.50. Other prices remain about the same.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	9.00
Short shoveling turnings	6.50
Cast iron borings	(No market)
Stove plate	7.00
Steel axles	15.00 to 16.00
Iron axles	18.00
No. 1 railroad wrought	8.00
Rails for rolling	11.50 to 12.00
No. 1 cast	9.00
Tramcar wheels	10.00 to 10.25
Cast iron borings, chem	13.50

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PACIFIC COAST

Award of Steel for Golden Gate Bridge Imminent

SAN FRANCISCO, July 13.—More than 84,000 tons of structural shapes and 12,000 tons of reinforcing bars will be placed during the next four weeks, including steel for the Golden Gate bridge, awarding of the contracts for which has again been delayed pending satisfactory sale of the first block of bonds. Lettings of structural shapes, reinforcing bars and cast iron pipe in the past week were all well above the year's average.

BARS

More than 2000 tons was let during the week, principally for public work and practically all outside of San Francisco and Los Angeles. The largest award was to an unnamed interest for 614 tons for new sewage mains at Phoenix, Ariz. About 8000 tons will be awarded during the next week. Prices are firm and unchanged.

SHAPES

Awards were upward of 1500 tons. The largest, 450 tons, went to the Pacific Coast Engineering Co. for 500 cars for the Pacific Fruit Express. Prices continue at 2.05c. for standard material and at 2.15c. for wide flange type.

PLATES

Bids were opened by Tacoma, Wash., July 13, on 52-in. welded steel pipe that will require 750 tons of 5/16 in. plate. The Willamette Iron & Steel Co. took 650 tons for digesters

Warehouse Prices, f.o.b. San Francisco
(Less than 5000 Lb.)

	Base per Lb.
Plates and structural shapes (¼-in. and heavier)	2.80c.
Soft steel bars	2.80c.
Reinforcing bars	2.90c.
Hot-rolled annealed sheets (No. 24)	3.90c.
Hot-rolled sheets (No. 10)	3.40c.
Galv. sheets (No. 24)	4.40c.
Struc. rivets, ½-in. and larger—over 2 tons	5.50c.

Warehouse Prices, f.o.b. Los Angeles
(Less than 5000 Lb.)

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing bars	2.80c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10)	3.50c.
Galv. sheets (No. 24)	4.20c.
Struc. rivets, ½-in. and larger	5.00c.

Warehouse Prices, f.o.b. Seattle
(Less than 5000 Lb.)

	Base per Lb.
Plates and structural shapes	2.50c.
Soft steel bars	2.50c.
Reinforcing bars	3.00c.
Hot-rolled annealed sheets (No. 24)	3.65c.
Hot-rolled sheets (No. 10)	3.15c.
Galv. sheets (No. 24)	4.15c.
Structural rivets	5.50c.

for the Weyerhaeuser Timber Co. and 300 tons was awarded to an unnamed bidder for floating derricks at the Mare Island Navy Yard in California. About 1000 tons is involved in specifications for 30 and 36-in. welded steel pipe at Salt Lake City.

CAST IRON PIPE

More than 6000 tons was up for bids or placed during the week. National Cast Iron Pipe Co. was awarded 728 tons of 4 and 6-in. for the San Francisco Water Department, and United States Pipe & Foundry Co. took 886 tons of 8 and 12-in. for the same buyer. Pacific States Cast Iron Pipe Co. was low bidder on 2365 tons of 2 to 6-in. Class B or 150 for Oakland. American Cast Iron Pipe Co. took 830 tons of 20 and 24-in. Class 100 for Vallejo. Burbank opened bids for 266 tons of the same sizes; Utilities Equipment Corpn. of Los Angeles was low bidder.

SHEETS

Mill prices, c.i.f. Pacific Coast ports, have been announced as follows, based on the new classification: hot-rolled No. 10, 2.33c.; hot-rolled annealed No. 24, 2.88c.; galvanized No. 24, 3.38c. Movement is light.

WIRE PRODUCTS

Domestic mills announced special new carload prices of $2.40, base, per keg, f.o.b. San Francisco warehouse, and $2.45, Los Angeles, applying only to 4d. to 60d. common wire nails, 4d. to 20d. box nails and 6d. and 8d. finishing nails. These are understood to be temporary prices to put the warehouse trade in position to meet foreign competition and are expected to hold for perhaps 90 days. The less-carload base on the above sizes is $2.65, a decline of 25c. Base for other sizes and cement coated is unchanged.

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Canada

Dominion Markets Are Extremely Quiet

TORONTO, July 14.—There was a slight spurt in pig iron sales the early part of last week, but business slumped again at the close. No forward buying is being done. Local blast furnace representatives say that melters look for no general improvement in business until the latter part of the quarter. Production is gradually slowing down, but no furnaces have been blown out. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	20.50

STRUCTURAL STEEL

The demand for building steel is holding up well. While sales for the

week were mostly in small lots, some large contracts are pending for early closing.

OLD MATERIAL

The limited business in finished iron and steel is reflected in a general slowing down in scrap sales. According to both Toronto and Montreal dealers, the demand for scrap borders on stagnation. Dealers are out of the market.

Dealers' buying prices for old material:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	....	10.00
Stove plate	....	8.00
Standard carwheels	....	8.50
Malleable	....	8.00
Per Net Ton		
No. 1 mach'ry cast	11.00	....
Stove plate	9.00	....
Standard carwheels	10.00	....
Malleable scrap	9.00	....

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Railroad Equipment

Railroad locomotives shipped in June totaled 19 units as against 26 in May, according to reports received by the Bureau of the Census from principal manufacturing plants. In each month the shipments covered steam locomotives only, and all were for domestic account. Unfilled orders at the end of June increased to 95 locomotives from 58 at the end of May.

Standard Fruit Railroad Co., LaCeiba, Honduras, has ordered through the Equitable Equipment Co., Inc., one locomotive of 2-8-0 type from American Locomotive Co.

Navy Department has ordered six helium tank cars from General American Tank Car Corpn.

Missouri Pacific has placed an order for two 75-ft. gas-electric rail motor cars with St. Louis Car Co.

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Fulton Iron Works, St. Louis, has announced through H. J. Steinbreder, chairman of the board, that negotiations have been virtually completed for its consolidation with the Goslin-Birmingham Mfg. Co., Birmingham, and thereby becomes a subsidiary of the Whiting Corpn., Harvey, Ill.

The Fulton Iron Works was founded 79 years ago and makes sugar mill machinery and Diesel engines.

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The National Transportation Meeting of the Society of Automotive Engineers will be held at the Shoreham Hotel, Washington, on Oct. 27, 28 and 29, instead of from Nov. 10 to 12, as previously announced. This change was made to avoid conflict with the annual meeting of the American Petroleum Institute in Chicago, Nov. 10 to 12.

Reinforcing Steel

Awards in Larger Volume—Inquiries Slightly Lower

OF the 5600 tons of reinforcing steel contracted for the past week about 3000 tons is for activities on the Pacific Coast. The largest award, 1200 tons, is for a Veterans' Hospital at Seattle. New projects will take 4000 tons, compared with 4550 tons in the previous week. Approaches for a railroad bridge at Henderson, Ky., call for 750 tons, on which bids opened July 15. Awards follow:

HACKENSACK, N. J., 250 tons, reservoir for Hackensack Water Co., to Igoe Brothers.

NEWARK, N. J., 100 tons, sewer construction, to Truscon Steel Co.

PHILADELPHIA, 300 tons, sewer for city at Mingo Creek, to Taylor-Davis, Inc.

WASHINGTON, 300 tons, foundation for gas holder, to McClintic-Marshall Corpn.

WASHINGTON, 110 tons, Congressional apartments (Methodist Building), to Capital Fireproof Products Corpn.

CLEVELAND, 300 tons, Columbus Road bridge, to Truscon Steel Co.

BERRIAN COUNTY, MICH., 105 tons of mesh for State highway paving, to Capitol Steel Corpn.

LANSING, MICH., 100 tons, City National Bank, to Capitol Steel Corpn.

MIDLAND COUNTY, MICH., 390 tons of wire mesh and reinforcing steel for State highways, to Capitol Steel Corpn.

HAMMOND, IND., 175 tons, Court House, to W. J. Holladay Co.

CHICAGO, 700 tons, Western Electric Co., to an unnamed bidder.

STATE OF ILLINOIS, 100 tons, road work, to Concrete Engineering Co.

PHOENIX, ARIZ., 350 tons, hotel, to an unnamed bidder.

PHOENIX, 614 tons, extensions to sewage system, to an unnamed bidder.

LANE COUNTY, ORE., 163 tons, Hell Gate bridge over Willamette River, to Mercer Steel Co.

SEATTLE, 1200 tons, hospital for United States Veterans' Bureau, to Bethlehem Steel Co.

SEATTLE, 340 tons, Albro Place viaduct, to Western Construction Co.

SANTA CLARA COUNTY, CAL., 100 tons, Coyote Creek highway bridge, to an unnamed bidder.

PASADENA, CAL., 100 tons, Post building, to an unnamed bidder.

LOS ANGELES, 100 tons, McPherson Street paving, to an unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

CAMBRIDGE, MASS., 230 tons, underpass at end of Harvard bridge.

FOXBORO, MASS., 206 tons, State bridges.

STATE OF NEW JERSEY, 150 tons, highway construction at Newton, route 31, section 9, to Samuel B. Martin, Sussex, N. J., contractor.

STATE OF NEW JERSEY, 100 tons, highway construction in Sussex County, to S. J. Groves, Ridgefield Park, N. J., contractor.

MITCHEL FIELD, LONG ISLAND, 160 tons, 18 small buildings.

NEW YORK CENTRAL RAILROAD, 300 tons, sewer construction on Eleventh Avenue, New York. Remo Construction Co., general contractor.

FREEPORT, N. Y., 100 tons, two public schools.

HENDERSON, KY., 750 tons, approaches for Ohio River bridge for Louisville & Nashville Railroad; bids open July 15.

MILWAUKEE, 400 tons, Swift & Co.; general contract awarded.

ST. LOUIS, 125 tons, grade crossing revision for St. Louis-San Francisco Railway.

LOS ANGELES COUNTY, CAL., 260 tons, widening bridge over Santa Ana River; Byerts & Dunn, general contractors.

LOS ANGELES COUNTY, 111 tons, storm drains.

SAN FRANCISCO, 140 tons, Aquatic Park pier; Healy-Tibbitts Construction Co., general contractor.

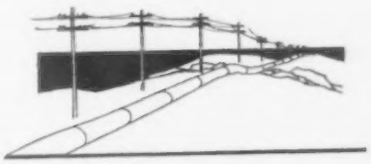
RENO, NEV., 110 tons, hospital.

BEVERLY HILLS, CAL., 400 tons, City Hall.

SAN FRANCISCO, 150 tons, West Portal School.

BERKELEY, CAL., 110 tons, University of California track stadium.

NYSSA, ORE., 200 tons, United States Bureau of Reclamation, Thief Valley dam.



PIPE LINES

Atlantic Refining Co. has placed an order for 180 miles of 10¾-in. seamless pipe, amounting to about 15,000 tons, with the National Tube Co. The line will extend from the east Texas fields.

United States Engineer Office, Vicksburg, Miss., is asking bids until July 21 for 20 sections ⅜-in. thick flange steel, welded dredging pipe, each section 30 ft. long.

Texas Pipe Line Co., Houston, Tex., a subsidiary of Texas Corpn., same address, has completed surveys for a 6-in. pipe line from a point near Yates oilfield to Big Lake, Tex., and vicinity, about 27 miles. It is proposed to develop the line to a maximum of 25,000 bbl. daily.

El Paso Natural Gas Co., El Paso, Tex., has secured a natural gas franchise at Las Cruces, N. M., and will build a pipe line to that city from its main El Paso-Douglas, Ariz., line, about 25 miles, and will install a distributing system in city.

Western Service Corpn., Oklahoma City, Earl R. Ernsberger, president, has surveys under way for installation of 20-in. natural gas pipe line from Oklahoma City oilfields, through Tulsa, and to points in north. It will cost more than $10,000,000.

Simms Oil & Gas Co., Inc., Belle Center, Ohio, is planning a natural gas pipe line in northern part of Logan County, about 33 miles, to connect with trunk line of Ohio Fuel Gas Co., near Marion, Ohio, to cost $150,000. W. A. Simms is general manager.

Missouri Valley Gas Co., Kansas City, Mo., has placed contract with S. R. Dresser Mfg. Co., Bradford, Pa., for a quantity of couplings to connect about 180 miles of 26-in. pipe in Kansas.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

MILL PRICES OF SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$29.00 to $30.00
Rerolling, 4-in. and under 10-in., Youngstown	29.00 to 30.00
Rerolling, 4-in. and under 10-in., Cleveland	29.00 to 30.00
Rerolling, 4-in. and under 10-in., Chicago	31.00 to 32.00
Forging quality, Pittsburgh	35.00 to 36.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$29.00 to $30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$29.00 to $30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.65c.
Universal	1.65c.
Sheared	1.65c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00
Cleveland	35.00
Chicago	36.00

PRICES OF RAW MATERIAL

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron, dry, Spanish or Algerian	8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic or foundry, Swedish, average 65% iron	9.00c.
Iron ore, basic and foundry, Russian, average 63% iron	9.00c.
Manganese ore, washed 52% manganese, from the Caucasus	25c. to 27c.
Manganese ore, African or Indian, 50 to 52%	24c. to 26c.
Manganese ore, Brazilian, 46 to 48%	22c. to 24c.
Tungsten ore, high grade, per unit, in 60% concentrates	$12.00 to $12.50

	Per Gross Ton
Chrome ore, 45% Cr_2O_3 crude, c.i.f. Atlantic seaboard	$20.00
Chrome ore, 48% Cr_2O_3 crude, c.i.f. Atlantic seaboard	22.50

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.40
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.50
Foundry, by-product, Ch'go ovens	7.50
Foundry, by-product, New England, del'd	10.50
Foundry, by-product, Newark or Jersey City, delivered	8.70 to 9.10
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.60
Mine run coking coal, f.o.b. W. Pa.	1.50 to 1.60
Gas coal, ¾-in., f.o.b. Pa. mines	1.80 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.70 to 1.80
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80¾, seaboard	*$80.00 to $85.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*80.00 to 85.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$28.00 to $30.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	31.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$25.00	13%	$29.00
11%	26.00	14%	31.00
12%	27.00	15%	33.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$19.00 to $21.00	11%	$22.00 to $24.00
7%	19.50 to 21.50	12%	23.00 to 25.00
8%	20.00 to 22.00	13%	25.00 to 27.00
9%	20.50 to 22.50	14%	27.00 to 29.00
10%	21.00 to 23.00	15%	29.00 to 31.00

Delivered prices at Chicago are about 50c. a ton below this schedule.

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd, carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.25
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	24.50c. to 26.00c.
Ferrochromium, 0.06% carbon	26.50c. to 28.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	105.00
1% carbon grade	115.00
Spot prices	$5 a ton higher

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$14.00
No. 2 lump, Illinois and Kentucky mines	17.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	17.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

Per 1000 f.o.b. Works

	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$40.00 to $43.00	$32.00 to $35.00
Maryland	40.00 to 43.00	32.00 to 35.00
New Jersey	40.00 to 43.00	.....
Ohio	40.00 to 43.00	32.00 to 35.00
Kentucky	40.00 to 43.00	32.00 to 35.00
Missouri	40.00 to 43.00	32.00 to 35.00
Illinois	40.00 to 43.00	32.00 to 35.00
Ground fire clay, per ton	6.50	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	49.00
Birmingham	47.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

MILL PRICES OF BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	73 and 10
†Carriage bolts	73 and 10
Lag bolts	73 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads	73 and 10
Hot-pressed nuts, blank or tapped, square,	73 and 10
Hot-pressed nuts, blank or tapped, hexagons,	73 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	73 and 10
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	73 and 10
Semi-finished hexagons castellated nuts, S.A.E.,	73 and 10
Stove bolts in packages, P'gh.	80, 10, 10, 10 and 5
Stove bolts in packages, Ch'go.	80, 10, 10, 10 and 5
Stove bolts in pkgs., Cleveland.	80, 10, 10, 10 and 5
Stove bolts in bulk, P'gh.	80, 10, 10, 10, 5 and 2½
Stove bolts in bulk, Ch'go.	80, 10, 10, 10, 5 and 2½
Stove bolts in bulk, Cleveland,	80, 10, 10, 10, 5 and 2½
Tire bolts	60, 10 and 10

Discounts of 73 and 10 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S.S. thread,	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.70c. to 1.80c.
Del'd Philadelphia	1.94c. to 1.99c.
Del'd New York	1.98c. to 2.03c.
F.o.b. Cleveland	1.65c. to 1.70c.
F.o.b. Lackawanna	1.75c. to 1.80c.
F.o.b. Birmingham	1.70c. to 1.75c.
C.i.f. Pacific ports	2.10c.
F.o.b. San Francisco mills	2.10c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.60c. to 1.65c.
F.o.b. Birmingham, mill lengths	1.75c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.30c. to 1.35c.
F.o.b. Chicago Heights mill	1.60c. to 1.65c.
Del'd Philadelphia	1.84c. to 1.89c.

Iron

Common iron, f.o.b. Chicago	1.70c. to 1.80c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.70c. to 1.80c.
F.o.b. Birmingham	1.70c. to 1.75c.
Del'd Cleveland	1.78½c. to 1.83½c.
Del'd Philadelphia	1.85½c.
F.o.b. Coatesville	1.75c.
F.o.b. Sparrows Point	1.75c.
F.o.b. Lackawanna	1.75c.
Del'd New York	1.93c.
C.i.f. Pacific ports	2.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.70c. to 1.80c.
F.o.b. Birmingham	1.70c.
F.o.b. Lackawanna	1.75c.
F.o.b. Bethlehem	1.75c.
Del'd Cleveland	1.78½c. to 1.83½c.
Del'd Philadelphia	1.76c. to 1.81c.
Del'd New York	1.90½c.
C.i.f. Pacific ports	2.05c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, Pittsburgh	1.65c.
Wider than 6 in., P'gh	1.55c.
6 in. and narrower, Chicago	1.75c.
Wider than 6 in., Chicago	1.65c.
Cooperage stock, P'gh	1.75c. to 1.85c.
Cooperage stock, Chicago	1.85c. to 1.95c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.15c.
Strips, Cleveland	2.15c.
Strips, deliv'd Chicago	2.43c.
Strips, Worcester	2.30c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.20c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

	Base per Lb.
Smooth annealed wire	2.25c. to 2.35c.
Smooth galvanized wire	2.70c. to 2.80c.
Polished staples	2.25c. to 2.35c.
Galvanized staples	2.50c. to 2.60c.
Barbed wire, galvanized	2.45c. to 2.55c.
Woven wire fence, per net ton	$60.00
	Base per Keg
Standard wire nails	$1.80 to $1.90
Smooth coated nails	1.80 to 1.90
Galvanized nails	3.80 to 3.90

To Retail Trade

	Base per Lb.
Bright wire	2.30c. to 2.40c.
Smooth annealed wire	2.40c. to 2.50c.
Smooth galvanized wire	2.90c. to 3.00c.
	Base per Keg
Standard wire nails	$1.90 to $2.00
Cement coated nails	1.90 to 2.00
Galvanized nails	3.90 to 4.00
	Base per Lb.
Polished staples	2.45c. to 2.55c.
Galvanized staples	2.70c. to 2.80c.
Barbed wire, galvanized	2.65c. to 2.75c.
Woven wire fence, per net ton	$65.00

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Sheets

Hot-Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.70c.
No. 10, f.o.b. Chicago mills	1.80c.
No. 10, del'd Philadelphia	1.99c.
No. 10, f.o.b. Birmingham	1.85c.
No. 10, c.i.f. Pacific Coast ports	2.33c.

(Note: To above prices are added extras for annealing and for width over 48 in., and for less than five tons of each gage or size.)

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Chicago mills	2.50c.
No. 24, del'd Philadelphia	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, c.i.f. Pacific Coast ports	2.88c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.35c.
No. 10 gage, f.o.b. Chicago mills	2.45c.
No. 10 gage, del'd Philadelphia	2.64c.
No. 10 gage, f.o.b. Birmingham	2.50c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Chicago mills	3.05c.
No. 20 gage, del'd Philadelphia	3.24c.
No. 20, f.o.b. Birmingham	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	3.10c.

Steel Furniture Sheets

No. 10, f.o.b. Pittsburgh	2.75c.
No. 20, f.o.b. Pittsburgh	3.35c.

(Prices on furniture stock include stretcher leveling but not resquaring).

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago Mills	3.00c.
No. 24, del'd Philadelphia	3.19c.
No. 24, f.o.b. Birmingham	3.05c.
No. 24, c.i.f. Pacific Coast ports	3.38c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. P'gh	3.15c.

Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh	3.10c.
No. 20, f.o.b. Pittsburgh	3.60c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.55c. to 2.65c.
No. 26, Chicago mills	2.65c. to 2.75c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mills	$5.00
Standard cokes, f.o.b. Gary	5.10

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.30
15-lb. coating I.C.	12.90
20-lb. coating I.C.	14.00
25-lb. coating I.C.	$15.20
30-lb. coating I.C.	16.00
40-lb. coating I.C.	17.80

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1¼% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
Chromium Nickel Vanadium		1.50
Carbon Vanadium		0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.70
Spikes ½ in. and larger	2.70
Spikes, boat and barge	2.90
Tie plate, steel	1.95
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49⅛	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2½%, and on galvanized by 1½ points, with supplementary discounts of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Europe's Financial Crisis Affects Tin—Zinc Strong on Cartel Renewal

NEW YORK, July 14.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 14	July 13	July 11	July 10	July 9	July 8
Lake copper, New York	8.12½	8.12½	8.62½	8.62½	8.62½	8.62½
Electrolytic copper, N. Y.*	7.50	7.50	7.75	7.75	7.75	7.75
Straits tin, spot, N. Y.	24.62½	25.00	....	25.62½	25.00	25.30
Zinc, East St. Louis	3.90	3.90	3.90	3.85	3.85	3.90
Zinc, New York	4.25	4.25	4.25	4.20	4.20	4.25
Lead, St. Louis	4.22½	4.22½	4.22½	4.22½	4.22½	4.22½
Lead, New York	4.40	4.40	4.40	4.40	4.40	4.40

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

COPPER

The primary producers have held steadily at 8c. a lb., delivered Connecticut Valley, for electrolytic, but custom smelters have offered metal at 7.75c., delivered. The copper market has been less active, a condition attributed to the influence of the European financial situation. In fact, export sales have not exceeded 10,000,000 lb., compared with considerably heavier selling abroad previously. The export price quoted by Copper Exporters, Inc., was reduced from 9.27½c. to 8.77½c. and a further revision downward was made at the end of last week to 8.25c., c.i.f. usual European ports. The latest reduction includes a revision of ocean freight rates, which had not been reflected in the delivered price previously. Lake copper continues inactive, and the quotation has declined from 8.62½c. to 8.12½c. a lb., delivered. While the statistical report of copper stocks for June was unfavorable, as had not been unexpected, showing 600,827 tons of refined and blister copper, in certain quarters it was regarded with optimism as being a better showing than had been expected. The total stocks included 413,474 tons of refined and 187,353 tons of blister. Production in the first six months of this year was 605,840 tons, compared with 701,511 tons in the same period of 1930.

TIN

Following some speculative buying of tin a week ago, based on anticipation of favorable results from the debt and reparations moratorium, there have been sharp fluctuations in the price as a result of the changing financial situation in Central Europe. Consumer buying has been fair, and was especially active on July 9 and 13. Yesterday, fluctuations in the price were rapid, quotations advancing from 24.50c. in the morning to 25.10c. in the early afternoon and declining to 24.80c. late in the day. In London today, prices were almost £8 a ton under the quotation a week ago, with spot standard at £109 10s., future standard at £111 5s. and spot Straits at £111 5s. The Singapore price was £116 2s. 6d., a decline of £5 12s. 6d. from a week ago. A further decline in stocks of tin in British warehouses was reported on Saturday, with the total at 31,941 tons, a decrease of 135 tons from the previous week. This is attributed to a shipment of 150 tons of tin to the United States. Shipments of Straits tin to June 11 were 3231 tons.

LEAD

Demand is slightly smaller than during the buying movement about two weeks ago, but consumers are still active buyers of carload lots for prompt and August shipment, so that the price continues quite firm at 4.22½c. St. Louis, or 4.40c., New York. The continued activity in prompt carloads of lead is considered by sellers as evidence that stocks in consumers' hands are not excessive.

ZINC

Primary producers have maintained 3.90c. a lb., East St. Louis, for prime Western zinc, but sales were made by second hands at 3.85c., mostly in small quantities. The total of such sales is generally placed at little more than 400 tons. Reports from Europe received on July 11 that the European zinc cartel had been renewed brought substantial offers to buy at 3.85c., and the price stiffened to 3.90c., East St. Louis. Certain producers, which have practically withdrawn from the market, are holding to 4c. a lb., but are not obtaining any business at this price.

ANTIMONY

The market is statistically well situated, with only small stocks in consumers' hands, but prompt shipment Chinese metal is quoted at 6.90c., New York, duty paid, compared with 7c., a week ago. There is almost no forward buying, and antimony for future delivery could probably be obtained at 6.60c., New York, according to importers.

NICKEL

Electrolytic cathodes are quoted at 35c. a lb., and shot and ingot nickel from remelted electrolytic at 36c. a lb. for prompt shipment of small lots.

ALUMINUM

According to published prices, virgin metal, 98 to 99 per cent pure, is quoted at 22.90c. a lb., delivered.

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	15.50c.
*Copper, hot rolled, base sizes	17.87½c.
Seamless Tubes—	
Brass	20.37½c.
Copper	20.37½c.
Brass Rods	13.75c.
Brazed Brass Tubes	24.37½c.

*Extra for cold-rolled, 3c. per lb.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	9.00c. to 9.50c.
Zinc sheets, open	10.00c. to 10.50c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	26.50c. to 27.50c.
Tin, bar	28.50c. to 30.50c.
Copper, Lake	10.00c. to 11.00c.
Copper, electrolytic	9.50c. to 10.00c.
Copper, casting	9.25c. to 9.75c.
Zinc, slab	5.00c. to 5.50c.
Lead, American pig	5.25c. to 6.25c.
Lead, bar	7.00c. to 8.00c.
Antimony, Asiatic	9.50c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	20.00c. to 22.00c.
Alum. ingots, No. 12 alloy	19.00c. to 21.00c.
Babbitt metal, commercial grade	20.00c. to 30.00c.
Solder, ½ and ½	17.75c. to 18.75c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	29.75c.
Tin, bar	31.75c.
Copper, Lake	10.25c.
Copper, electrolytic	10.25c.
Copper, casting	9.25c.
Zinc, slab	5.50c. to 5.75c.
Lead, American pig	5.25c.
Lead, bar	7.75c.
Antimony, Asiatic	10.00c.
Babbitt metal, medium grade	15.00c.
Babbitt metal, high grade	34.00c.
Solder, ½ and ½	19.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (All prices are nominal because of uncertain condition of market.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.00c.	6.75c.
Copper, hvy. and wire	5.75c.	6.50c.
Copper, light and bottoms	4.75c.	5.75c.
Brass, heavy	3.25c.	4.00c.
Brass, light	2.50c.	3.50c.
Hvy. machine composition	4.75c.	5.50c.
No. 1 yel. brass turnings	3.50c.	4.25c.
No. 1 red brass or compos. turnings	4.25c.	5.00c.
Lead, heavy	3.25c.	3.75c.
Zinc	1.50c.	2.00c.
Sheet aluminum	9.50c.	11.50c.
Cast aluminum	3.50c.	6.00c.

FABRICATED STRUCTURAL STEEL

Awards of 119,500 Tons Include 86,000-Ton Bridge—New Projects Light

AWARDS of fabricated structural steel this week are 119,500 tons, including the 86,000-ton Golden Gate bridge in San Francisco. Bookings also cover a section of elevated express highway in New Jersey, calling for 11,000 tons, and 6100 tons in a grade crossing elimination, part of the same project.

Fresh fabricated steel projects total 19,000 tons, which compares with 20,000 tons a week ago, and 52,500 tons two weeks ago. Included are 2500 tons for a post office in Seattle, 1200 tons for a post office in Little Rock, Ark., 1100 tons for a pier in San Diego, Cal., and 1000 tons for a United States Department of Public Health building in Washington. Awards follow:

North Atlantic States

PROVIDENCE, R. I., 500 tons, Court House addition, to Lehigh Structural Steel Co.

CAMBRIDGE, MASS., 250 tons, two Harvard University units, to New England Structural Co.

WEST CHELMSFORD, MASS., 265 tons, runway and granite shed for Fletcher Granite Co., to McClintic-Marshall Corpn.

NEW HAVEN, CONN., 375 tons, Yale University dormitory, to Pittsburgh Bridge & Iron Co.

NEW HAVEN, CONN., 430 tons, divinity school building, Yale University, to American Bridge Co.

NEW HAVEN, CONN., 280 tons, quadrangle building, to Bethlehem Fabricators, Inc.

JAMAICA, N. Y., 555 tons, building for Harriman Avenue Corpn., to Berkshire Iron Works.

NEW YORK, 600 tons, public school No. 229 at College Point, to Easton Structural Steel Co.

NEW YORK, 425 tons, Thirtieth Street steel grillage for New York Central Railroad, to American Bridge Co.

PENNSYLVANIA RAILROAD, 1400 tons, miscellaneous electrification steel to be fabricated in railroad's Altoona shops.

NEW YORK, 585 tons, Union Theological Seminary building, to Bethlehem Fabricators, Inc.

NEW YORK, 645 tons, Madison Avenue Methodist Episcopal Church, to George A. Just Co.

NEW YORK, 320 tons, New York Central bridges at Woodlawn, to Harris Structural Steel Co.

WANTAUGH, L. I., 340 tons, Long Island Railroad bridge, to Fort Pitt Bridge Works Co.

HACKENSACK, N. J., 500 tons, County administration building, to F. C. Schaefer Iron Works.

ST. LAWRENCE COUNTY, N. Y., 150 tons, highway bridge, to American Bridge Co.

HERKIMER, N. Y., 315 tons, highway bridge, to American Bridge Co.

BUFFALO, 100 tons, new plant for Oliver Gear & Machinery Co., to Kellogg Structural Steel Co.

ARDMORE, PA., 725 tons, school in lower Merion district, to Bethlehem Fabricators, Inc.

ELBERON, N. J., 110 tons, grade crossing elimination, to Bethelehem Fabricators, Inc.

STATE OF NEW JERSEY, 6100 tons, route 25, section 1, grade crossing elimination, to McClintic-Marshall Corpn.

STATE OF NEW JERSEY, 11,000 tons, viaduct highway, route 25, at Kearny, to McClintic-Marshall Corpn.

JOHNSTOWN, PA., 300 tons, Masonic Temple, to Griffith-Custer Co.

The South

BATON ROUGE, LA., 967 tons, eight bridges for Louisiana Highway Commission: Natchitoches Parish, 145 tons to Braird Corpn., Birmingham; Washington Parish, 125 tons; Baton Rouge Parish, 100 tons, Union Parish, 100 tons; Homer Parish, 100 tons; Rapides Parish, 155 tons and Pointe Coupe Parish, 102 tons to Virginia Bridge & Iron Co., and Sabine Parish, 140 tons, to Pidgeon-Thomas Iron Co.

Central States

CLEVELAND, 200 tons, chronic hospital, to an unnamed fabricator.

DETROIT, 350 tons, grade crossing elimination for Michigan Central Railroad, to American Bridge Co.

INDIANAPOLIS, 2865 tons, telephone building, to American Bridge Co. and Central States Bridge & Structural Co.

PRAIRIE DU CHIEN, WIS., 425 tons, floor plate for bridge, to American Bridge Co.

STATE OF MINNESOTA, 305 tons, highway bridges, to American Bridge Co. and Minneapolis-Moline Power Implement Co.

ST. LOUIS, 1160 tons, columns for Illinois Terminal warehouse, to Missouri Rolling Mill Corpn.

CHICAGO, BURLINGTON & QUINCY, 300 tons, girder spans, to an unnamed bidder.

Western States

SAN FRANCISCO, CAL., 86,000 tons, Golden Gate bridge; tentatively awarded to McClintic-Marshall Corpn., for 78,000 tons, and to American Bridge Co., 8000 tons. Formal award awaits bond issue.

SAN FRANCISCO, 125 tons, apartment building, to Judson-Pacific Co.

SALEM, ORE., 300 tons, four State highway bridges, to Pacific Iron Works.

Canada

NEW WESTMINSTER, B. C., 350 tons, Canadian National Railways bridge, to Dominion Bridge Co.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

ROCKPORT, MASS., 290 tons, standpipe.

CANTON-WESTWOOD-DEDHAM, MASS., 200 tons, State bridge.

BOSTON, 125 tons, elevated station at Charles and Cambridge Streets.

WEYMOUTH, MASS., 100 tons, standpipe.

NEW YORK, 185 tons, elevated express highway foundation work.

PHILADELPHIA, 100 tons, store at 1219 Market Street for Richman Brothers Co., Cleveland.

PHILADELPHIA, 2000 tons, pedestrian concourse at Twelfth and Walnut Streets; bids open July 28.

PHILADELPHIA, 150 tons, bank building at 1510 Walnut Street.

PHILADELPHIA, 250 tons, apartment building at Forty-second and Walnut Streets.

PHILADELPHIA, unstated tonnage, alterations to Academy of Natural Sciences, Nineteenth and Race Streets.

PHILADELPHIA, 100 tons, addition to Philadelphia Art Alliance building, 251 South Eighteenth Street.

NORRISTOWN, PA., 200 tons, three 90-ft. plate girder spans for Montgomery County; bids open July 16.

BALTIMORE, 400 tons, bridge over Gunpowder Falls.

WASHINGTON, 1000 tons, building for United States Department of Health.

PITTSBURGH, 900 tons, repairs to two boats for Pittsburgh Steamship Co.

South and Southwest

HIGH POINT, N. C., unstated tonnage, six-story building for Adams Mills Corpn.

HOUSTON, TEX., 500 tons, addition to Post Office; R. A. McKee, El Paso, Tex., general contractor.

DALLAS, TEX., 600 tons, additions for Armstrong Packing Co.

BEAUMONT, TEX., 600 tons, piling for municipal docks.

LITTLE ROCK, ARK., 1200 tons, Post Office.

LAS VEGAS, N. M., 300 tons, Federal Building.

Central States

CINCINNATI, 1500 tons, *Times-Star* building; bids July 20.

SOUTH BEND, IND., 800 tons, Post Office.

CHICAGO, 850 tons, Jefferson Electric Co.; general contract awarded.

GALESBURG, ILL., 400 tons, viaduct.

MILWAUKEE, 500 tons, Solomon Juneau High School; bids close July 30.

REEDSTOWN, WIS., 300 tons, highway bridge.

STATE OF MINNESOTA, 550 tons, highway bridges.

TOPEKA, KAN., 500 tons, Medical Arts Building.

COLUMBUS, NEB., 400 tons, highway bridge.

Western States

SALT LAKE CITY, 860 tons, Post Office.

LOS ANGELES, 480 tons, Wilshire Income Properties building.

LOS ANGELES, 350 tons, Vernon-Downey bridge.

SEATTLE, 150 tons, Lake Washington Canal crossing for two 200-ft. towers.

SEATTLE, 2500 tons, Post Office.

SAN FRANCISCO, 200 tons, Y.W.C.A. building.

SACRAMENTO, CAL., 240 tons, highway bridge in Madera County.

SAN DIEGO, CAL., 1100 tons, Broadway pier.

Advance in Continental Steel Prices Brings Orders to British Mills

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(*By Cable*)

LONDON, ENGLAND, July 13.

AT the annual meeting of the joint industrial council of the Welsh plate and sheet industry, the chairman, H. A. Bond, appealed to all concerned to endeavor to maintain the country's present trade despite severe foreign competition.

He urged the necessity of keeping costs low, but pointed out that it is not the intention of employers to reduce the workers' standard of living. He called attention to the success of the National Food Canning Council in firmly establishing the domestic canning industry, which is providing an increased outlet for tin plate, but said that the tin plate makers must be competitive in foreign markets as their product is primarily exported.

British steel makers held their long awaited meeting on July 10, but the generally expected downward revision of prices was not made, to the considerable disappointment of many consumers, who have been holding back orders. A revival of business is considered to be less probable as a result, but mills are maintaining operating rates as some tonnage has been diverted to them by the recent rise in Continental prices.

Shipbuilding is at the lowest ebb in many years, and Tyne yards have one of the smallest totals of construction on hand in their history, with only four vessels on stocks.

The Continental Steel Cartel meets in Brussels, Belgium, July 17, to seek a final agreement for renewal. Success of the negotiations is rather uncertain, chiefly because of the insistence of Belgium and Luxemburg on their claims.

Siam negotiates with Japanese Government Works for a tonnage of rails.

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Soviet order for British forging presses totals $243,000.

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Members of Continental Steel Cartel produced 231,000 tons under the total quota for May.

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Kobe Steel Works in Japan will increase wire rod output from 50,000 tons to 150,000 tons annually.

* * *

German machinery industry is at about 45 per cent, with decline especially great in machine tools and textile machinery.

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The May production by members of the steel cartel was 231,000 tons under the authorized quota for the month, Germany under producing by 220,000 tons, Belgium by 11,000 tons, Luxemburg, 10,000 tons, the Saar, 4000 tons. France over produced by 14,000 tons. The French Comité des Forges is urging the Government to increase import duties on iron and steel.

Negotiations of the Continental Wire Cartel held in Paris were unsuccessful and its formation appears unlikely because of disagreement between Dutch and Belgian producers. The Czechoslovakian Wire and Wire Nail Works sales office will be abandoned at the end of this year.

The International Rail Makers' Association will meet in London, Oct. 2, to discuss prices and general policies. Meanwhile, the Siamese State Railways are negotiating with the Government Works in Japan for purchase of rails, as the rail makers' association is unwilling to reduce prices. The Dutch railroads have awarded 30,000 tons of rails to the Koenigs und Laurahuette in Poland.

The British Government's credit extension of £6,000,000 ($29,160,000) for trade in iron, steel and heavy engineering equipment, excluding ships, has been used on orders from the Soviet Union for £50,000 ($243,000) worth of forging presses, placed with Duncan Stewart & Co., Ltd., Glasgow.

The Stavely Coal & Iron Co., Ltd., has begun production of centrifugal cast iron pipe under license of the Sand Spun Pipe Corporation of America.

The British pig iron market is quiet and with the Scottish holidays, but little revival in buying is expected before the end of August. Cleveland

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.8665 (par)

British Prices, f.o.b. United Kingdom Ports

Ferromanganese, export	£9	0s.					$43.74		
Billets, open-hearth	5	0	to	£5	7½s.		24.30	to	$26.12
Black sheets, Japanese specifications	10	5					49.82		
Tin plate, per base box	0	13½	to	0	14¼		3.25	to	3.46
							Cents a Lb.		
Steel bars, open-hearth	7	17½	to	8	7½		1.71	to	1.81
Beams, open-hearth	7	7½	to	7	17½		1.60	to	1.71
Channels, open-hearth	7	12½	to	8	2½		1.66	to	1.76
Angles, open-hearth	7	7½	to	7	17½		1.60	to	1.71
Black sheets, No. 24 gage	8	10					1.84		
Galvanized sheets, No. 24 gage	9	7½	to	9	10		2.03	to	2.06

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2	8s.	to	£2	9s.		$11.66	to	$11.91
Billets, Thomas	£3	7s.	to	£3	8s.		$16.28	to	$16.52
Wire rods, low C., No. 5 B.W.G.	5	0	to	5	5½		24.30	to	25.64
Rails, light	6	0					29.20		
Black sheets, No. 31 gage, Japanese	11	5	to	12	12		54.68	to	58.32
							Cents a Lb.		
Steel bars, merchant	3	11	to	3	15		0.77	to	0.81
Beams, Thomas, British standard (nominal)	3	8½	to	3	10		0.74	to	0.76
Channels, Thomas, American sections	5	12	to	5	14		1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	3	10	to	3	11		0.76	to	0.77
Angles, Thomas, 3-in.	3	12	to	3	13		0.78	to	0.79
Hoops and strip steel over 6-in. base	4	5					0.94		
Wire, plain, No. 8 gage	5	0					1.09		
Wire, barbed, 4-pt. No. 12 B.W.G.	8	15					1.89		

furnacemen's wages have been reduced ¼ of 1 per cent under the sliding scale agreement, but operators still insist that costs of production are too high to permit a reduction in pig iron prices.

The tin plate market is moderately active, but buyers expect reduced prices, although foreign sheet bars have advanced. Consumers, however, are seeking prompt delivery, indicating that stocks are low. More tin plate mills have resumed operation, and production is now at about 65 per cent of capacity.

French production in May was 725,000 tons of pig iron with 129 furnaces in blast at the end of the month. Raw steel output was 674,000 tons. Rolled steel production included 47,000 tons of rails, 67,000 tons of shapes, 19,000 tons of wire rods, 15,000 tons of drawn wire, 17,000 tons of hoops, 13,000 tons of tubing, 14,000 tons of special steel bars, 153,000 tons of merchant steel bars, 7000 tons of tin plate, 43,000 tons of sheets thinner than 5 mm., and 25,000 tons of sheets, 5 mm. and heavier.

Total iron and steel exports of the United Kingdom in June were 163,000 tons. Pig iron exports totaled 26,000 tons, of which the United States was sent 270 tons.

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Japan to Increase Wire Rod Output

YOKOHAMA, JAPAN, June 6.—Following a study of European and American methods of wire rod production, the Kobe Steel Works is preparing to increase its output of wire rods from the present capacity of 50,000 tons annually to about 150,000 tons. The present Japanese capacity for wire rod production is 105,000 tons a year, so that the Kobe works expansion will increase the total for the country to 205,000 tons. At present about 40,000 tons of wire rods are imported annually from European, American and Canadian mills. The expanded capacity of the Kobe works is expected to curtail materially these imports, and may provide a small surplus for export.

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German Machinery Trade at 45 Per Cent Output

HAMBURG, GERMANY, July 2.—The German machinery building industry is operating at an average of 45 per cent of capacity. Certain branches of the industry, such as builders of cranes, sugar machinery, food preparing equipment and pumps, report improvement, while there has been a slight decline in activity among builders of machine tools, textile and other machinery. The recession of business is more noticeable in the domestic than in export markets.

British Process Welds 100-In. Steel Pipe

LONDON, ENGLAND, July 1.—A contract for five miles of 15-in. welded steel pipe has been awarded by the Sunderland Gas Co. to the South Durham Steel & Iron Co. The pipe is being made by the automatic arc welding process in the first plant of the kind in the United Kingdom. The process makes welded pipe from 15 to 100 in. in diameter and up to 30 ft. in length. The bent plate, ready for welding, is passed over a horn having air operated rams, which force the edges together while a welding head with two arcs moves along the seam, completing the weld in a single movement.

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British Production of Iron and Steel Drops

LONDON, ENGLAND, July 10 (*By cable*).—Output of pig iron in Great Britain in June was 323,800 gross tons, with steel ingots and castings at 428,900 tons. Both showed a decrease from May, in which month production was 346,500 tons of pig iron and 435,100 tons of steel ingots and castings.

Production for the first six months of 1931, with comparisons of monthly averages of recent years, and of 1913, are shown below:

Date	Pig Iron	Steel
1913	855,000	638,600
1928	550,800	710,000
1929	632,400	804,600
1930	516,400	608,200
1931—January	337,200	402,200
February	318,200	486,400
March	357,100	500,100
April	323,200	397,400
May	346,500	435,100
June	323,800	428,900

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Indian Pig Iron Duty Retained

WASHINGTON, July 7.—The Indian Government has approved the recommendation of the Indian tariff commission that the present tariff of 12½ per cent on pig iron be retained, says a radiogram from the assistant trade commissioner in Calcutta.

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British Have New Liquid for Rustproofing

LONDON, ENGLAND, July 1.—A coating for rustproofing iron or steel has been developed by the Norrust Liquid Co., Ltd., London, under the brand name of "Nust." The preparation is described as lead, liquified and held in suspension in oil. It is claimed to possess the qualities of molten lead and may be applied to the metal with a brush.

Japan Urged to Make Wire Duty 20 Per Cent

YOKOHAMA, JAPAN, June 6.—The domestic manufacturers of galvanized wire are forming a national federation made up of the present Eastern and Western guilds. Meanwhile, the manufacturers are petitioning the Department of Finance to increase the import duties on finished wire of all kinds from the present rate of 18 per cent ad valorem. In requesting higher duties, the makers point out that the present rate is the same for both wire and wire rods and that the wire duty should be raised to at least 20 per cent ad valorem.

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Seasonal Decline in Corporation's Orders

Unfilled orders of the United States Steel Corpn. at June 30 were 3,479,323 tons. This is a drop of 141,129 tons, or 3.9 per cent, from the May 31 total of 3,620,452 tons. It is almost precisely the equivalent of the average decline between May 31 and June 30 of the preceding ten years, which was 137,000 tons. In these ten years seven years showed declines and three years showed increases, one of the latter having been as small as 2000 tons.

At the June 30 level, orders are 491,000 tons lower than a year ago, and 777,000 tons lower than at the end of June, 1929. The current figure is the lowest since that for Sept. 30, 1930. With that exception it is the lowest since that for May 31, 1928.

Unfilled tonnage at the end of each month for the past two and a half years follows:

	1931	1930	1929
January	4,132,351	4,468,710	4,109,487
February	3,965,194	4,479,748	4,144,341
March	3,995,330	4,570,653	4,410,718
April	3,897,729	4,354,220	4,427,763
May	3,620,452	4,059,227	4,304,167
June	3,479,323	3,968,064	4,256,910
July	.....	4,022,955	4,088,177
August	.....	3,580,204	3,658,211
September	.....	3,424,338	3,902,581
October	.....	3,481,763	4,086,562
November	.....	3,639,636	4,125,345
December	.....	3,943,596	4,417,193

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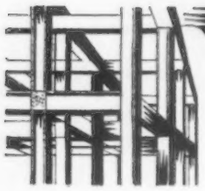
Ambrose Swasey Gives $250,000 to Foundation

Ambrose Swasey, of the Warner & Swasey Co., Cleveland, who established the Engineering Foundation, has just added $250,000 to his previous gifts, making the total endowment $750,000, it was announced by John V. M. Dorr, president of the United Engineering Trustees, Inc., and H. Hobert Porter, chairman of the foundation.

The Engineering Foundation was created by Mr. Swasey in 1914 as a research instrumentality for the engineering profession and for broad service to mankind.



PLANT EXPANSION AND EQUIPMENT BUYING

Machine Tool Trade Waiting for Orders

Business Extremely Dull in All Sections —Improvement Not Expected Before September

THE machine tool industry is waiting for orders, which probably will fail to come until there is a definite improvement in the general business situation. The general opinion is that there will be no revival of demand before September. A good many substantial orders are pending, but prospective purchasers are not likely to take action until their own businesses have improved.

Bright spots in the equipment markets are hard to find. A preliminary list of about 50 metal-working and wood-working tools and accessories has been issued by the Board of Transportation, New York, for a subway repair shop, and formal bids will be taken soon, but the specifications involve so much red tape that many of the New York dealers will not submit bids.

The Chicago Board of Education has again deferred action on tools for the Austin High School. Some cities are faced with curtailed tax income and prospective tool purchases for manual training departments are not likely to be made soon.

The General Electric Co. has bought a number of machines for its Peterboro, Ont., plant. A refrigerator company bought two lathes.

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NEW YORK

The Board of Transportation of New York has issued specifications for machinery and accessories for the new 207th Street subway repair shops. About 50 metal-working and wood-working machines and a large quantity of accessories are listed. Bids will be asked for soon, it being the intention of the Board of Transportation to have the shop fully equipped and running by fall. Because of the fact that the specifications require installation of the machines and involve other things that are foreign to the usual selling practices of the machine tool trade, some of the machine tool dealers will not bid on the list. Aside from this one development, there is nothing of interest in the local machine tool market. Business is deadly dull, and there is little hope that a revival in demand will occur before early fall. A good many substantial orders are pending, but it is apparent that nothing will be done about them until the general business situation has taken a definite turn for the better.

CLEVELAND

The volume of machinery business continues light. While there is nothing promising in the outlook for the next few weeks, some manufacturers are looking for a slight improvement this month over June, basing that expectation on the fact that some prospective business that has been dormant is now showing some life. The General Electric Co. purchased several machines the past week for its Peterboro, Ont., plant. Dealers are selling quite a few small tools. Curtailed income from taxation evidently is causing some boards of education to postpone the purchase of equipment for manual training schools.

CINCINNATI

The machine tool market continues to reflect the hesitancy of buyers to make purchases until there is improvement in business. Orders the past week were few. Inquiry also was slow and requests were mostly for special types of machines or modification of standard types. Production remains unchanged. A manufacturer of refrigerators bought two 11-in. lathes from a local maker.

CHICAGO

July is following closely in the path of June from the viewpoint of sales and inquiries for machine tools, and there are as yet no indications of improvement in the near future. Inquiries are extremely spotty. The State of Illinois has placed orders for machine tools amounting to more than $6,000. Remaining items on other lists are dormant, and dealers are beginning to take the attitude that few, if any, additional purchases will be made against these old lists. The Chicago Board of Education met last week and again deferred action on machine tool equipment for the Austin High School.

NEW ENGLAND

Aside from five medium-priced lathes sold to a New York company, local dealers' sales the past week were practically nil. New England machine tool builders report a dearth of orders and further curtailment in plant operations. Sentiment now is that no appreciable increase in business can be expected before September. In the used tool field business is confined largely to bench tools. One dealer sold an eight-spindle drill to a Massachusetts user, and two 14-in. lathes to another. A spurt in sales is noted by some small tool manufacturers.

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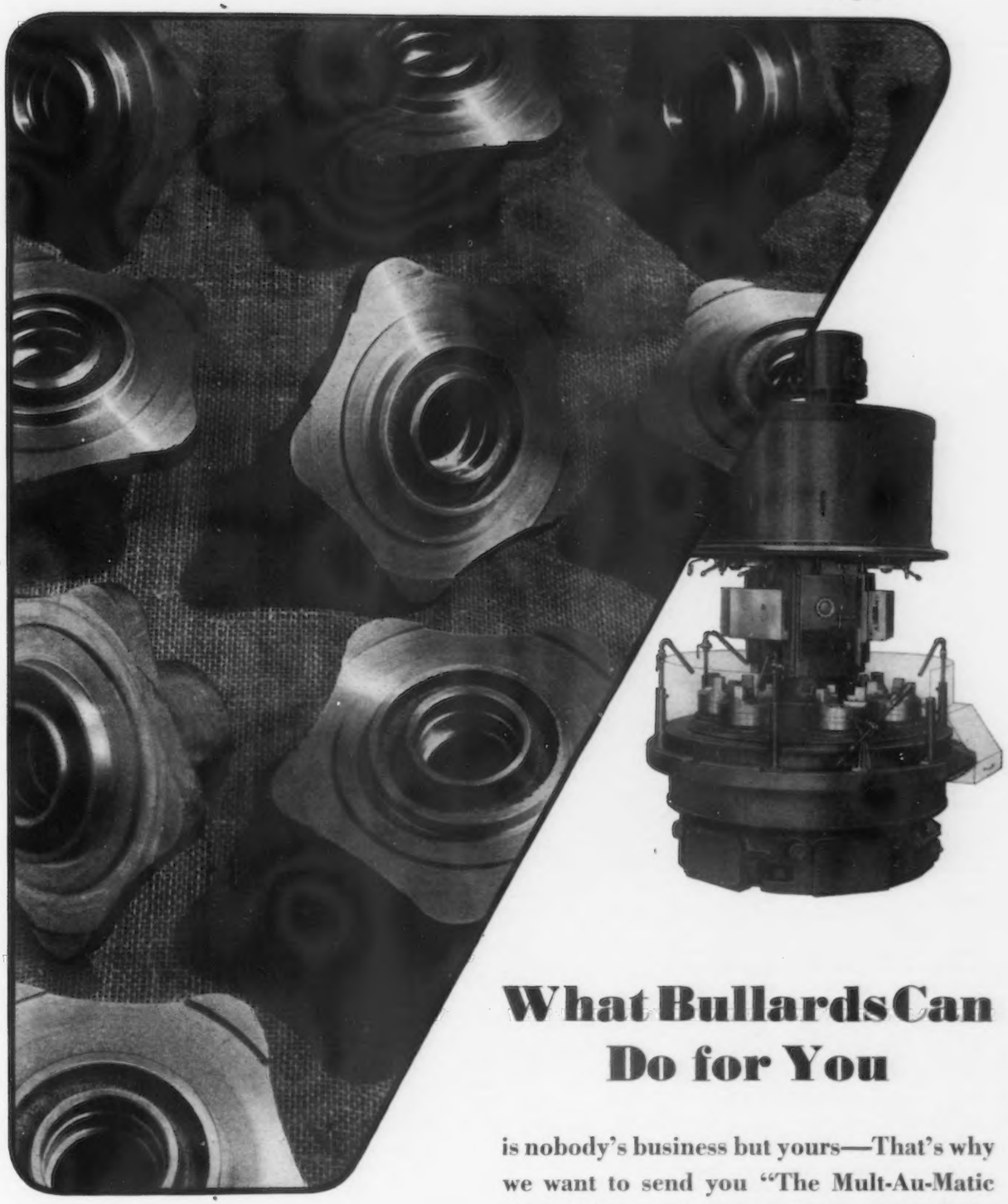
New York

CONTRACT has been let by Western Electric Co., 195 Broadway, New York, to Ouilmette Construction & Engineering Co., 200 East Walton Place, Chicago, for two additions to plant at Hawthorne, near Chicago, six stories, 75 x 250 ft., and one story, 300 x 375 ft., to cost close to $500,000 with equipment. New units will be used for loading coil and loading coil case manufacturing departments.

Consolidated Gas Co., 4 Irving Place, New York, has plans for a multi-story artificial gas generating plant on Hunts Point Avenue, Bronx, about 90 x 195 ft., to cost over $400,000 with machinery. J. F. Hunter, chief engineer, is in charge.

New York Power & Light Corpn., Albany, N. Y., and New York Edison Co., 4 Irving Place, N. Y., have applied for



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BRIDGEPORT, CONNECTICUT

permission to proceed with construction of steel tower transmission lines from Albany and vicinity to a point in Westchester County, where system of first-noted will be tied-in with New York Edison system, to cost about $7,246,000, with power substation near Troy, N. Y., to cost over $1,000,000, as well as other power substations and switching stations.

J. Sarsfield Kennedy, 157 Remsen Street, Brooklyn, architect, will prepare plans for a multi-story automobile service, repair and garage building at Pacific Street and Boerum Place, to cost over $300,000 with equipment.

Department of Sanitation, Municipal Building, New York, Dr. William Schroeder, Jr., chairman, has begun construction of first unit of municipal sewage treatment and disposal plant on Ward's Island, to include power house, pumping station, compressor plant and other units; entire plant will be electrically operated. It is expected to require four years for completion and will be supplemented by additional units later, to cost $30,000,000 for first unit and over $275,000,000 for entire project during period of ten years.

American Mineral Spirits Co., 205 East Forty-second Street, New York, manufacturer of refined petroleum products, has asked bids on general contract for extensions and improvements in former plant of Williams & Clark Division of American Agricultural Chemical Co., Carteret, N. J., recently acquired, to cost over $80,000 with equipment. C. A. Sheridan, 114 Lincoln Avenue, Carteret, is engineer.

Joseph H. Rose, Jr., 271 Grand Street, Newburgh, N. Y., and associates have organized Hudson Valley Iron Works, with capital of $10,000, to operate a local iron and metal-working plant. John C. Clancy, 199 Lander Street, Newburgh; and John A. Holliday, Spring Valley, N. Y., are interested in company.

Unique Art Mfg. Co., 196 Waverly Avenue, Newark, manufacturer of mechanical toys, parts, etc., has purchased adjoining property and will erect a two-story addition, to cost about $100,000 with equipment. Saul Shaw & Co., 24 Commerce Street, are architects and engineers.

Elizabethtown Consolidated Gas Co., 16 West Jersey Street, Elizabeth, N. J., has plans for a two-story steam power plant, to cost over $60,000 with equipment.

Board of Education, Administration Building, Jersey City, N. J., has awarded general contract to Auf Der Heide Contracting Co., 350 Jackson Avenue, West New York, N. J., for addition to power plant and other work at Dickinson High School, to cost $471,900, including new school unit. John T. Rowland, Jr., 30 Journal Square, is architect.

Miners Fuel & Heating Co., recently consolidated with Riddell Stoker Co., R. C. Parker, 153 Franklin Street, Bloomfield, N. J., president, has leased property at 580 Market Street, Newark, N. J., formerly part of works of Balbach Smelting & Refining Co., and will establish plant for manufacture and servicing of heating equipment for industrial and other buildings. Executive offices will be located at same place.

Bureau of Yards and Docks, Washington, has awarded contract to Seacoast Iron Works, Inc., Red Bank, N. J., for new hangar unit at naval air station at Lakehurst, N. J., at $73,000, exclusive of equipment.

Standard Oil Co. of New Jersey, 26 Broadway, New York, has work under way on new bulk oil storage and distributing plant at Hackensack, N. J., for which general contract was recently awarded to Enstice Brothers, 111 Academy Street, Newark, N. J., to include a foam generator house, pumping station, power house, can-filling plant, and garage for company motor trucks and cars, including repair department, to cost over $450,000 with equipment.

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New England

PLANS are under way by Connecticut Yacht Service, Inc., Post Road, Stamford, Conn., for a new yacht-building and repair plant. Work will soon begin on one-story shop, 20 x 50 ft., to be followed by other units, to cost over $40,000 with equipment.

Board of Selectmen, Hamilton, Mass., is considering installation of manual training department in new two-story and basement high school to cost about $150,000, for which bids have been asked on general contract. Charles G. Loring, 7 Water Street, Boston, is architect.

Four operating subsidiaries of Massachusetts Utilities Associates, 89 Broad Street, Boston, have applied for permission to issue additional stock, majority of proceeds to be used for extensions and improvements in plants and system as follows: Milford Electric Light Co., Milford, stock for $137,500; Woburn Gas Light Co., Woburn, stock for $109,800; Northampton Electric Lighting Co., Northampton, stock for $59,000; and Lexington Gas Co., Lexington, stock for $181,500.

Irving T. Arnold, 53 Dexterdale Road, Providence, R. I., and associates have organized William S. Glines Co., Inc., and plan operation of local shop for manufacture of machinery and parts.

Berst-Foster-Dixfield Co., Dixfield, Me., manufacturer of wood novelties, etc., has awarded general contract to J. H. Kerr, Prospect Avenue, Rumford, Me., for a one and two-story power house and pumping plant at West Peru, Me., to cost about $45,000 with equipment. Company headquarters are in Grand Central Terminal, New York.

Constructing Quartermaster, Camp Devens, Mass., will receive bids until July 29 for installation of an electric distribution system.

Board of Public Works, City Hall, Somerville, Mass., is considering construction of a municipal automobile service, repair and garage building, to cost close to $100,000 with equipment.

Metal Products Corpn., New Haven, Conn., has been organized with capital of $100,000 by A. R. Stieler, 42 Cleveland Road, and associates, and plans operation of local factory for manufacture of metal cooking utensils, hardware products, etc. Henry Braun, 60 Chambers Street, is interested in company.

Equipment of L. Brayton Foundry Co., West Warwick, R. I., was sold at public auction on July 11.

Electric Boat Co., New London, Conn., has received notice to start work on a new government submarine. Plant changes will start at once for this contract.

Multisembler Corpn. has awarded contract to Schieldge Tool Co., Hartford, Conn., to manufacture automatic folding and inserting letters equipment. Order involves 16,000 machines.

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Philadelphia

FACTORY at Ontario and Janney Streets, Philadelphia, totaling about 30,000 sq. ft. floor space, has been leased by Purity Fibre Products Corpn., Packard Building, recently organized to manufacture fiber baking plates and kindred products. Company will equip for initial capacity of about 500,000 units a day and will have plant ready for operation in August. It will cost over $70,000. F. K. Sheesley, identified with Vanadium Corpn. of America, Inc., Pittsburgh, is president of new company; Robert R. Walton is vice-president in charge of production, and W. H. Heney, secretary.

I. T. E. Circuit Breaker Co., Nineteenth and Hamilton Streets, Philadelphia, manufacturer of high-tension electric switches, circuit breakers, etc., has asked bids on general contract for a one-story addition, to cost over $40,000 with equipment. J. Fletcher Street, 1120 Locust Street, is architect.

John Kelly, Inc., Philadelphia, has been organized to operate a local foundry for production of brass and other metal castings. David H. H. Felix, 1416 South Penn Square, is one of heads of new company and will be treasurer. C. Forman, address noted, is also interested in company.

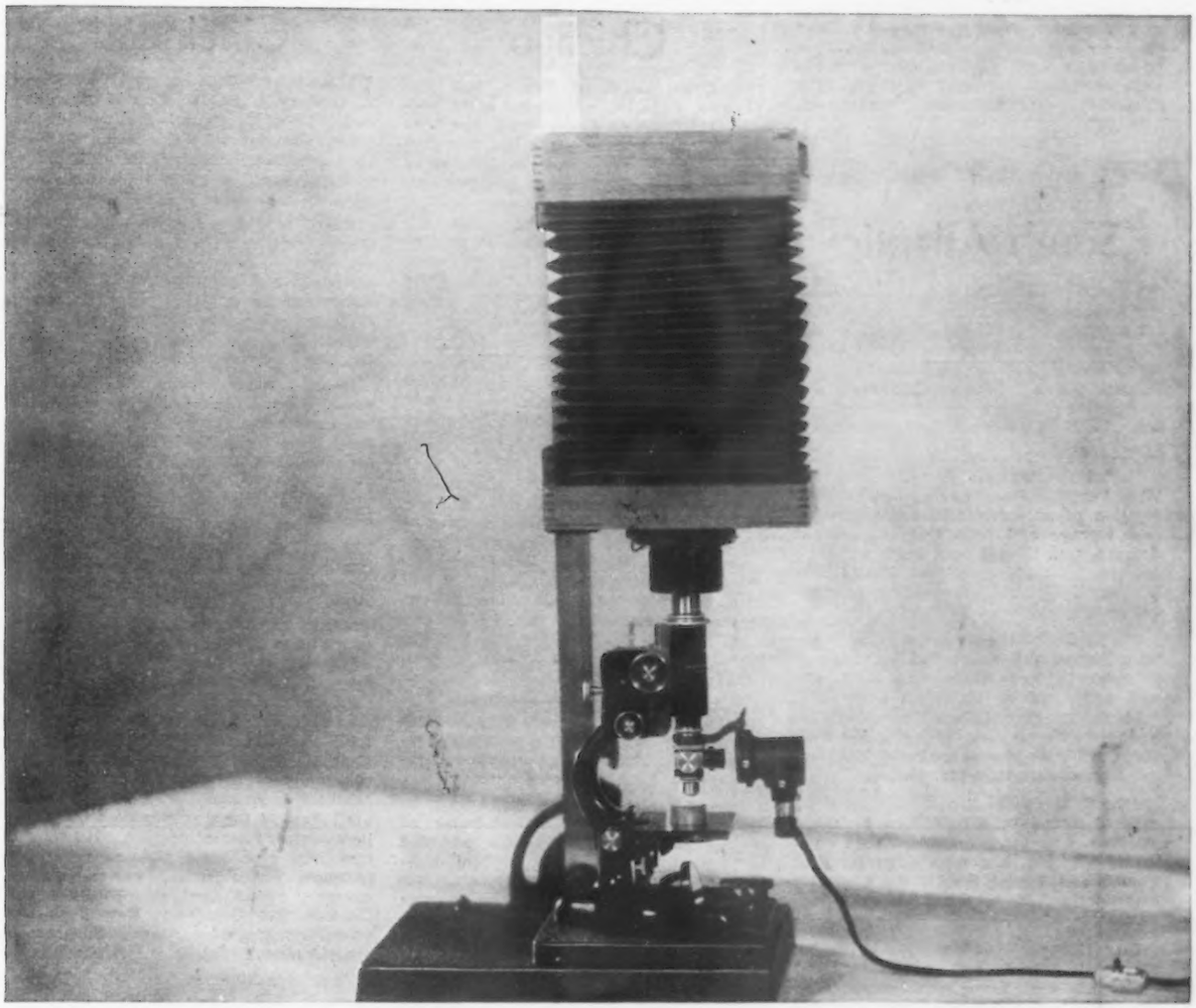
Standard Oil Co. of New Jersey, 26 Broadway, New York, is asking bids on general contract until July 20 for a bulk oil storage and distributing plant on site recently acquired at East Burlington, N. J., consisting of four main units to cost over $85,000 with equipment. Company will also build a dock on Delaware River with equipment for unloading oil and gasoline barges, etc.

Repp Orchard Products Co., Broad and Grove Streets, Glassboro, N. J., has asked bids on general contract for rebuilding fruit canning plant recently destroyed by fire, with loss of more than $100,000 including machinery. Louis H. Goettelman, Brooklawn, N. J., is architect.

John DeMaree, 316 South Twenty-second Street, Allentown, Pa., and associates have organized Fleetwood Corpn., Fleetwood, Pa., with capital of $15,000 and 1500 shares of stock, no par value, and plans operation of factory for manufacture of refrigerators, store fixtures, etc. William Deiley, 1816 Chew Street, Allentown, will be an official of new company.

State Highway Department, Harrisburg, Pa., is planning early purchase of new road-building and maintenance equipment to cost close to $1,500,000, including 35 12-ton road rollers, 3000 road drags, six steam shovels, 14 concrete mixers, 50 air drills, 55 10-ton tractors, 100 heavy-type road machines, 100 motor-operated graders and spreaders, and 95 stone spreaders.

Board of Directors, Valley Forge Mili-



When Responsibility Rests on Equipment

WHEN the story told by the instrument becomes the working data of the metallurgist, there must be no doubt as to whether or not the instrument is revealing *undistorted* facts. The battle against competition, the struggle to equal and surpass ever higher quality, is so keen and so important that chance must not enter in. The way to eliminate chance in production is to eliminate chance in control instruments by selecting those made by Bausch & Lomb.

Photomicrography has become indispensable to the proper working of metals, since the causes of failure of metals and their proper heat treatment are closely related to their crystalline structure. B & L Metallurgical Microscope FSM fills the need for identification of the crystalline structure of metals, and Model H Camera is an adequate means for recording the results of these examinations and for comparison of specimens with standard structures. These are illustrated above.

The body of Microscope FSM is removable from the arm and can be raised to permit extra thick objects to be placed on the stage. Provision is made for the insertion of an ordinary condenser for examinations of transparent objects. The H Camera holds a 5 x 7 plate. The camera is attached to the base by an inclination joint which permits the apparatus to be used in either a vertical or horizontal position.

Write for complete literature. BAUSCH & LOMB OPTICAL COMPANY, 621 St. Paul Street, Rochester, N. Y.

BAUSCH & LOMB

tary Academy, Valley Forge, Pa., has plans for a new science building, including laboratories, etc., to cost over $100,000 with equipment. Gabriel B. Roth, 1629 Chestnut Street, Philadelphia, is architect.

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South Atlantic

BOARD of Montgomery County Commissioners, Rockville, Md., is arranging a fund of $50,000 for purchase of site for a new senior high school near Takoma-Silver Spring, and proposes installation of manual training equipment. Plans will be drawn for structure to cost over $150,000. Edwin W. Broome is superintendent of schools.

United States Cold Storage Co., 2101 West Pershing Road, Chicago, plans early erection of superstructure for nine-story cold storage and refrigerating plant at Atlanta, Ga., to cost over $1,000,000 with machinery. A. Epstein, 2001 West Pershing Road, Chicago, is architect and engineer.

United States Department of Commerce, Washington, has authorized enlargement of flying field at Whitehouse, N. J., and will add tract of about 13 acres with field units. Five intermediate fields in Pennsylvania, on New York-Cleveland air route, will also be enlarged with buildings to accommodate transport planes.

John T. Hardaker, Inc., Charlotte, N. C., care of Boone D. Tillett, Law Building, attorney, now being organized with capital of $100,000, has secured property at Fourth and Poplar Streets for plant for manufacture of textile machinery and parts.

City Council, Valdosta, Ga., is asking bids until July 29 for an elevated steel tank and steel tower with capacity of 300,000 gal., for municipal water system. W. H. Gainey is city engineer.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids until Aug. 26 for an elevator at naval operating base, Pearl Harbor, T. H.

Guy M. Beaty, 1728 West Trade Street, Charlotte, N. C., has organized Guy M. Beaty Roofing Co., with capital of $50,000, and plans operation of local plant for manufacture of roofing and kindred products.

Gaylord Container Co., 229 Grand Street, Atlanta, Ga., manufacturer of cardboard and paper boxes and containers, has awarded general contract to Gilbert Beers, Bona Allen Building, for new one-story plant, 200 x 220 ft., with office, 25 x 52 ft., to cost over $85,000 with equipment.

Constructing Quartermaster, Fort Monroe, Va., has awarded contract to M. H. Sobel Co., First National Bank Building, Detroit, for 10 hangars with annexes and connecting bays at Langley Field, Va., including boiler houses and extensions to two present hangars, at $498,000.

Board of School Commissioners, Baltimore, is planning installation of manual training equipment in new three-story junior high school in Forest Park district, for which general contract was recently let to H. L. Maas & Sons, 1119 North Ensor Street, at $662,969. Smith & May, Baltimore Trust Building, are architects; Henry Adams, Calvert Building, is mechanical engineer.

Chicago

FORMER plant of Union Tool Co., West Chicago, comprising eight one-story buildings on 5-acre tract, has been acquired by Lindsay Light Co., 161 East Grand Avenue, Chicago, manufacturer of gas-lighting equipment, gas mantles, etc., which will remove branch plant at 361 East Illinois Street, Chicago, to that location. Capacity will be increased at new works. Plant of Union Tool Co. was moved a few months ago to Toledo, Ohio, and consolidated with National Supply Co., of which it is a subsidiary.

Peoples Gas Light & Coke Co., 122 South Michigan Boulevard, Chicago, operating artificial gas and other utility properties, has secured permission to issue bonds in amount of $15,000,000, part of proceeds to be used for extensions and improvements.

Board of Public Works, Minneapolis, Minn., has plans for a coal pier and terminal at foot of Washington Avenue bridge, Mississippi River, and will install mechanical-loading and unloading machinery and conveying equipment. It will cost about $200,000. City engineering department, City Hall, N. W. Elsberg, city engineer, is in charge. New terminal has been leased to Kanawha-Mississippi Coal Co., Charleston, W. Va.

Signal Corps Procurement District, Chicago, will receive bids until July 21 for a quantity of dry batteries, minimum requirements, 172,900, and maximum requirements, 395,150 battery units.

Archer-Daniels-Midland Co., Roanoke Building, Minneapolis, manufacturer of linseed oil products, etc., has awarded general building contract to McKenzie-Hague Co., Corn Exchange Building, for an addition to grain elevator on Twenty-ninth Avenue, S. E., to cost close to $1,000,000 with elevating, conveying, screening and other mechanical equipment.

Little Giant Mfg. Co., Peoria, Ill., recently organized with capital of $35,000 and 3500 shares of stock, no par value, will take over and expand Little Giant Products, Inc., with plant on North Adams Street, specializing in manufacture of automotive equipment, pulleys, tank tenders, etc. Incorporators of new company include Walter J. Becker and F. Vernon Hoit.

State Purchasing Department, State Capitol, St. Paul, Minn., H. W. Austin, purchasing commissioner, is asking bids until July 21 for addition to power house at State asylum, Willmar, to cost about $35,000 with equipment. Long & Thorshov, Andrus Building, Minneapolis, Minn., are architects; G. M. Orr Co., Baker Building, Minneapolis, is engineer.

Jefferson Electric Co., Chicago, has purchased property in Bellwood, Ill., and will erect a one and two-story factory containing 250,000 sq. ft., to cost about $550,000.

Cincinnati

PLANS have been completed by Kroger Grocery & Baking Co., 35 East Seventh Street, Cincinnati, for new branch plant, storage and distributing building at Carbondale, Ill., with installation of ovens, power, conveying and other equipment, to cost about $85,000.

Board of Education, Springfield, Ohio, plans installation of manual training equipment in new multi-story junior high school, to cost about $300,000, for which superstructure will soon begin. Eastmann & Budke, Columbia Building, are architects; Marley W. Lethley, Tecumseh Building, is associate architect.

Henry Fischer Packing Co., 1862 Mellwood Avenue, Louisville, meat packer, has awarded contract to Snead Architectural Iron Works, Tenth and Hills Streets, for four-story addition, 70 x 90 ft., to cost about $85,000 with equipment. Carl Fischer is one of company heads in charge.

Board of Water Commissioners, 107 North Second Street, Memphis, Tenn., is asking bids until Aug. 12 for power and other equipment for a waterworks expansion and improvement program, including two steam-driven air compressors, two turbo-centrifugal pumping units and two motor-driven pumping units, two 625-kva. turbo-generating units, two 500-hp. boilers with accessory equipment for coal fuel, including stokers, fans, etc., and alternate bids for similar equipment for gas fuel service; complete coal and ash-handling equipment. Bids will be asked until Aug. 14 for traveling crane, hydraulic elevator, filter equipment, 1200 tons of cast iron pipe, steel pipe, miscellaneous castings, sluice gates, valves, meters, electrical switchboard, etc. Fuller & McClintock, 170 Broadway, New York, are consulting engineers. James Sheahan is general superintendent.

Apex Machine & Tool Co., Dayton, Ohio, recently organized with capital of $75,000 and 1000 shares of stock, no par value, will take over and expand Apex Machine Co., with local plant, specializing in manufacture of tools and other equipment. John T. Dietz and Carl A. Lange head new organization.

Contracting Officer, Wright Field, Dayton, Ohio, will receive bids until July 20 for bracket assemblies, mounting clamps, cowl plates, oil cooler supports, etc.; until July 21 for propeller hub bolts, nuts, ring assemblies, cones, etc.; until July 22 for quantity of aircraft lighting and power cable; until July 27 for 156,000 ft. high-tension ignition cable; until July 29 for one electric dynamometer, one control panel, parts for changing resistor banks, etc.; and for 300 landing light assemblies.

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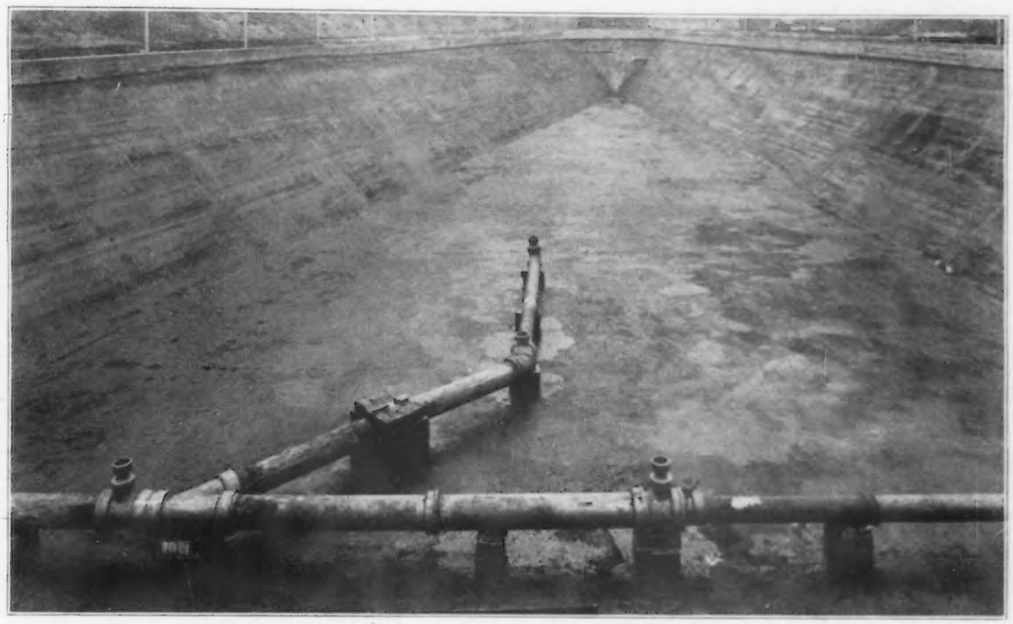
Milwaukee

GENERAL contract for a rolling mill extension, 84 x 116 ft., for Globe Steel Tubes Co., 3839 West Burnham Street, Milwaukee, has been placed with Worden-Allen Co., Port Washington Road. With piercing equipment, motors and other machinery, project will cost about $50,000.

Plankinton Packing Co., Muskego Avenue and Canal Street, Milwaukee, has placed general contract with Hunzinger Construction Co., 424 East Wells Street, for cold storage and curing building, 189

SPENT ACID DISPOSAL



14 pickling tanks empty into this pit...175 feet of Duriron pipe give trouble-free drainage . . . .

Here there is no worry about leaky drain-pipe, or expense of replacement at some not-distant date. The Motor Wheel Corporation, Lansing, Mich., took out insurance against any such eventuality. It was easy —they simply installed Duriron corrosion-resistant pipe in their modern system of disposing of spent acids from pickling tanks.

The concrete pit shown here is lined with two coats of asphaltum and has a capacity of 171,000 gallons. Fourteen tanks are dumped into the pit at the end of the week. The tanks are 116″ long, 44″ deep and 54″ wide and contain about a 7% sulphuric acid solution, kept at a temperature of 180°.

The solution runs about 2 to 2½% on leaving the tanks and about 3/10 of 1% on entering the sewer. The liquid from two lime tanks, which are dumped at the same time as the pickling tanks, aids in neutralizing the spent acid.

To carry the corrosive pickling solution from the tank drains to the disposal pit, 175 feet of 8″ Duriron pipe were laid. The *tight-calked joints* are a guarantee against leakage. Extreme resistance to acids—*outside, inside and all the way through*—means that the pipe-line once installed can be forgotten.

Duriron equipment is answering the corrosion problem in scores of plants. It may be the answer to *your* problem. Why not ask our engineers?

5 years of acid waste . . . no effect on pipe

Before installing the disposal system here described, the Motor Wheel Corporation used 100 feet of 8″ Duriron Pipe to carry waste sulphuric acid directly from the tanks to the sewer. The pipe was buried in the ground and had been in service 5 years. After being dug up inspection revealed no effects whatever from the acid!

THE DURIRON CO., INC.
438 N. Findlay St., Dayton, Ohio

DURIRON

x 146 x 96 ft., five stories and basement, costing $500,000 complete. Bids will be taken later on refrigerating system, two electric elevators, conveyors, and other equipment. Harry S. Culver is president and general manager

Bids will be taken about Aug. 1 by William E. O'Brien, city manager, Kenosha, Wis., for one 12,000,000-gal. low lift and one 12,000,000-gal. high lift pumping engines for waterworks pumping station. Alvord, Burdick & Howson, 20 North Wacker Drive, Chicago, are consulting engineers. Same engineers also designing new garbage incinerating plant for city of Kenosha, to cost about $200,000. Plans will be ready about July 25.

Board of Education, 22 West Dayton Street, Madison, Wis., is taking bids until July 23 for addition, 70 x 400 ft., four stories and basement to East Side High School. Frank Riley, 24 East Mifflin Street, is architect.

Common Council, Oshkosh, Wis., has ordered department of public works to advertise for bids for erection and equipment of central heating plant for city hall, fire department headquarters and patrol house. Estimated cost is $50,000. Emma Hebel is city clerk.

Aluminum Goods Mfg. Co., Manitowoc, Wis., manufacturer of drawn ware, kitchen and laboratory utensils, etc., has acquired substantial interest in Aluminum Co. of Canada, Ltd., Toronto, which is being reorganized as Aluminum Goods, Ltd., with George Vits, president, Manitowoc company, as chairman of board, and C. M. Salter, Toronto, as president and general manager. A. J. Vits and H. L. Vits, Manitowoc, will be members of board. Manitowoc company operates rolling mills and factories at Manitowoc and Two Rivers, Wis.

Buffalo

BOARD OF EDUCATION, Irondequoit, N. Y., is considering installation of manual training equipment in new school to cost about $200,000, for which bids are being asked on general contract until Aug. 1.

Hugh G. Nicholson, Jr., 145 Morgan Street, Tonawanda, N. Y., and associates have organized Nicholson Aircraft Corpn., with capital of $125,000, and plan operation of works at Buffalo for manufacture of airplanes, including parts and assembling. Bernard V. Leak, 216 Lisbon Street, Buffalo, is interested in new company.

Adirondack Mining Co., Gouverneur, N. Y., recently organized by C. H. Sprague, Gouverneur, and associates, has taken over talc deposits heretofore held by Mr. Sprague at Gouverneur and Fowler, N. Y., including Newton talc mine near mill of International Pulp Co., Gouverneur. Plans are under way for development of properties, including installation of mining machinery and power equipment. J. J. Wallace, superintendent of International Pulp Co., is interested in organization.

Consolidated Aircraft Corpn., 2050 Elmwood Avenue, Buffalo, has secured contract from Navy Department, Washington, for 23 patrol planes for aircraft vessels of Government fleet, at a price of $1,709,837.50. Curtiss Aeroplane & Motor Co., Buffalo, has taken a contract from Navy Department for 30 observation airplanes, two-seated type, at price of $443,235. Wright Aeronautical Corpn., Paterson, N. J., affiliated with Curtiss company, has been awarded a contract by Navy Department for 69 aircraft engines suitable for patrol planes, at price of $523,506.85.

Northern Machine Corpn., Camden, N. Y., recently organized by William J. Young, Camden, and associates, plans operation of local factory to manufacture machinery for paper bag production, including parts and assembling. Roscoe B. Skinner, Camden, is interested in organization.

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Cleveland

CITY Utilities Department, City Hall, Cleveland, has secured approval of State Board of Health for erection of sewage treatment and disposal plant, including boiler and power equipment, tanks, conveying and other handling equipment, etc., to cost $12,000,000. George B. Sewers is city engineer. George B. Gascoigne, Leader Building, is consulting engineer.

St. Marys Foundry Co., St. Marys, Ohio, specializing in production of gray iron castings, has begun erection of two one-story additions, designed to double present output. New equipment will include facilities for pouring heavy castings, weighing up to 15 tons. Expansion will cost about $60,000.

Libbey-Owens-Ford Glass Co., Nicholas Building, Toledo, Ohio, is arranging for a note issue of $9,000,000, part of fund to be used for general expansion in sheet glass manufacture, including purchase of plants of National Glass Co., Ottawa, Ill., recently consummated, and which will be added to company producing units.

Wabash Auto Parts, Inc., Toledo, Ohio, recently organized, will take over and expand company of same name with plant at 231 Belmont Street, manufacturer of automobile parts and equipment. Joseph G. Glock is principal incorporator.

Spicer Mfg. Corpn., 4100 Bennett Road, Toledo, Ohio, has arranged for closing of branch plant at South Plainfield, N. J., at one time main works of company. Company will concentrate production for automobile equipment, including universal joints, gears, etc., at main plant at Toledo and branch works at Pottstown, Pa.

Department of Public Service, Delphos, Ohio, Hugh Bickel, service director, plans installation of two boiler units, one gas-fired and other coal-fired, with digester and other equipment, in new sewage disposal plant to cost about $55,000, for which bids will soon be asked on general contract. A. H. Smith & Niles, Nicholas Building, Toledo, Ohio, are consulting engineers.

Schulte Grinding & Polishing Machine Co., Inc., 1958 West Forty-fifth Street, Cleveland, has succeeded Metal Finishers' Machine Co.

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Pittsburgh

BIDS have been asked on general contract by Board of Education, Arnold, Pa., for a two-story vocational shop, 25 x 120 ft., at Arnold Trade School, to cost close to $100,000 with equipment. P. R. L. Hogner, Smithfield Building, Pittsburgh, is architect.

Gulf Refining Co., Frick Annex, Pittsburgh, has filed plans for new bulk oil storage and distributing plant at Donora, Pa., to cost about $100,000 with equipment.

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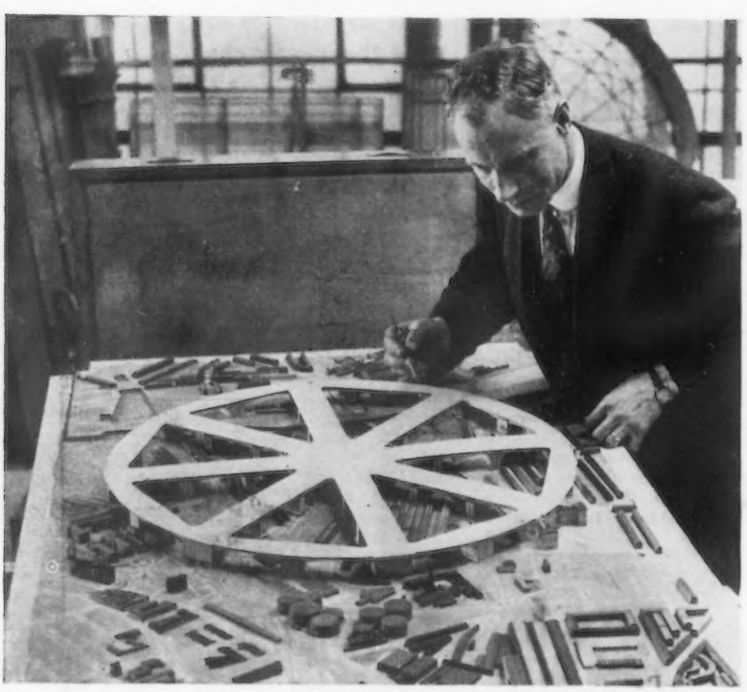
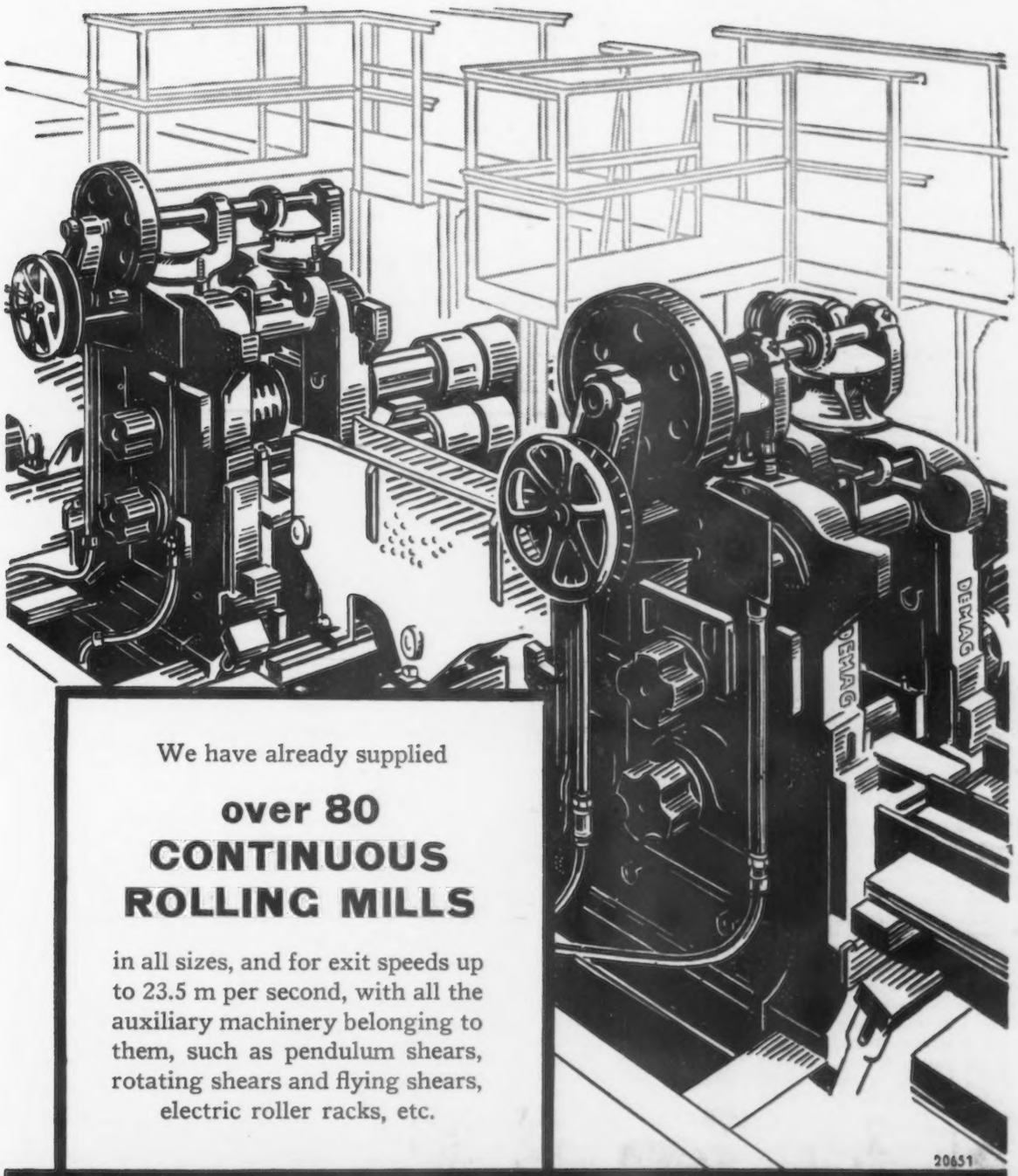
WILL THE CITY OF THE FUTURE BE LIKE THIS?



C. W. Glover, a member of a London firm of architects and engineers, with a model of his proposed central air and rail terminus for London. The project would cost about £5,000,000. It would provide a landing field above the buildings in the heart of London.



We have already supplied

over 80
CONTINUOUS ROLLING MILLS

in all sizes, and for exit speeds up to 23.5 m per second, with all the auxiliary machinery belonging to them, such as pendulum shears, rotating shears and flying shears, electric roller racks, etc.

DEMAG
DUISBURG

REPRESENTATIVE For U. S. A.: American Demag Corporation, 310 South Michigan Avenue, Chicago

Ultra-Penn Refining Co., Butler, Pa., has been organized by Frank C. Dodds, 560 Elm Street, and associates, with capital of $200,000, to operate an oil refining and compound plant. Mr. Dodds will be treasurer. H. H. Phillips and H. C. Eaton, both of Butler, are interested in company.

Hygrade-Sylvania Corpn. has been organized by officials of Sylvania Products Co., Emporium, Pa., manufacturer of radio tubes and equipment, and Hygrade Lamp Co., Salem, Mass., manufacturer of kindred products, to take over and consolidate companies. Nilco Lamp Work, St. Marys, Pa., a subsidiary of Sylvania company, will be included in merger. New organization plans expansion.

Superior Paper Products Co., Carnegie, Pa., has plans for a one-story and basement addition, 80 x 180 ft., to cost more than $65,000 with equipment. Braziell & Anderson, 309 Fourth Avenue, Pittsburgh, are architects.

Property of Butler County Oil Refining Co., South Avenue and Stengel Street, Pittsburgh, will be offered at a public sale by R. H. McClester and Joseph A. Beck, receivers, on July 28.

Board of Allegheny County Commissioners, City-County Building, Pittsburgh, has secured permission to arrange bond issue of $500,000 for establishing and maintaining airports in different parts of county.

Sterling Oil Co., Emlenton, Pa., R. S. Newton, head, has plans for a bulk oil storage and distributing plant at Meadville, Pa., with main unit, 33 x 160 ft., to cost over $75,000 with equipment.

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Detroit

PLANS have been filed by Detroit Edison Co., 2000 Second Avenue, Detroit, for addition to power substation, to cost $65,000 with equipment.

Board of Education, Otsego, Mich., contemplates installation of manual training equipment in new two-story and basement school, to cost $160,000, for which plans have been drawn by Billingham & Cobb, Kalamazoo, Mich., architects.

Quartermaster, Fort Wayne, Detroit, is asking bids until July 22 for a steam boiler with accessories.

Faigle Tool & Die Co., Inc., 180 South Campau Avenue, Detroit, recently organized by Karl Faigle, 1764 Field Avenue, and associates, plans operation of local plant for manufacture of tools, dies, jigs and kindred equipment. Byron L. McGraw, Detroit, will be an official of new company.

Board of Education, Midland, Mich., plans installation of manual training equipment in new multi-story high school to cost about $350,000, for which bids will be asked late in summer. R. V. Gay, St. Johns, Mich., is architect.

Hurd Lock Co., Almont, Mich., recently organized, will take over plant and property of E. P. Hurd Lock Co., 5820-22 Fischer Avenue, Detroit, and will succeed to former company. New organization will carry out expansion and will be actively identified with Almont Mfg. Co., Almont, manufacturer of metal castings, etc., with branch foundry at Imlay City, Mich. New company will manufacture a line of tire-locking devices for automobiles, in addition to general padlocks, etc. E. P. Hurd is president, and Charles D.

Ferguson, Almont, secretary and treasurer.

Michigan Canners Association, Fennville, Mich., has awarded general contract to James Michen, Fennville, for a one-story plant unit for storage and distribution, to cost over $30,000 with equipment. Pierre Lindhout, Grand Rapids, Mich., is architect.

Budd Wheel Co., 12141 Charlevaux Avenue, Detroit, has filed plans for a one-story addition to steel wheel manufacturing plant, to cost $30,000 with equipment. Company is branch of Budd Wheel Co., Philadelphia.

Copper Range Co. Consolidated, Calumet, Mich., has acquired properties of Naumkeag Copper Co., Naumkeag, Mich., and vicinity, and will operate in conjunction with its mines at Globe, Mich. Expansion will be carried out later.

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St. Louis

APPLICATION has been made by Union Electric Light & Power Co. of Illinois, Twelfth and Locust Streets, St. Louis, operating in southern Illinois, for permission to issue common stock totaling $7,500,000, majority of fund to be used for extensions and improvements, including acquisition of additional properties.

Milton R. Sachs, 6416 Cates Street, St. Louis, and associates have organized Sachs Corpn., and plan operation of factory for manufacture of electrical equipment and appliances.

W. B. Pine, McCulloch Building, Okmulgee, Okla., formerly United States Senator, and R. D. Pine, same address, have arranged for purchase of local plant of Interstate Window Glass Co. and plan to remodel for a line of glass manufacture, still to be determined. Same interests have secured an option on about 300 acres of dolomite properties in Arbuckle Mountain district, near Bromide, Okla., and plan to develop for raw material supply for glass works. Robert M. Isham, Okmulgee, chemical engineer, is consulting engineer for Pine interests.

J. I. Case Co., 700 State Street, Racine, Wis., manufacturer of agricultural implements and equipment, has asked new bids on revised plans for extensions in branch plant at Oklahoma City, one story, 50 x 200 ft., to cost over $65,000 with equipment. Frank J. Hoffman, James Building, Racine, is architect.

Board of Education, Pawnee City, Neb., contemplates installation of manual training equipment in new two-story and basement high school to cost about $140,000, for which bids have been asked on general contract. Meginnis & Schaumberg, Federal Trust Building, Lincoln, Neb., are architects.

City Council, Oklahoma City, has approved a resolution providing for a bond issue of $4,000,000, proceeds to be used for construction and operation of a municipal gas plant and system. City engineering department will be in charge.

Board of Water Commissioners, City Hall, St. Louis, has secured appropriation of $650,000 for extensions and improvements in city waterworks, including reconstruction of boiler plant at Chain of Rocks pumping station, with installation of new boilers and accessory power equipment, pipe lines, etc.

City Council, Paragould, Ark., has secured site for a municipal airport and plans erection of hangars, repair shops and other field units. Capt. C. W. Holderbaum, State House, Little Rock, Ark., State airport engineer, will consult with city in connection with project.

Multi-Color Sign Co., Fred W. Scheller, president, St. Louis, has been organized to manufacture electric signs and has opened a factory containing 3200 sq. ft. of floor space adjacent to plant of E. E. Souther Iron Co., Kienlen Street and St. Louis Avenue, which will manufacture metal parts used in construction of signs.

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Gulf States

WORK has been started by Automatic Mail Holder Co., Jacksonville, Fla., recently organized by H. L. Sipe, Jacksonville, and associates, on one-story plant, 55 x 100 ft., for production of metal mail containers and other metal specialties, to cost about $28,000 with equipment.

Coen Co., Inc., 112 Market Street, San Francisco, is considering development of a tract of Fuller's earth deposits near Gonzales, Tex., including installation of mining, crushing, screening and other equipment.

Board of Education, San Antonio, Tex., has plans for a new three-story junior high school to cost over $700,000 and contemplates installation of manual training department. Phelps & Dewees, Gunter Building, are architects.

Central Refining Co., Henderson, Tex., has begun erection of new oil refinery at Friar's Switch, Overton district, and will equip for a capacity of 10,000 bbl. a day, instead of 7500 bbl., as originally proposed. It will cost close to $250,000 with machinery.

Central Power & Light Co., San Antonio, Tex., has acquired electric light and power properties of George West Utilities Co., operating at George West, Tex., and vicinity, near Three Rivers. Purchasing company will consolidate properties with holdings, and will carry out expansion, including transmission lines.

Texas Citrus Fruit Growers' Exchange, Mission, Tex., John H. Shary, Mission, president, plans installation of conveying machinery, mechanical packing and handling equipment in new fruit packing plant at Harlingen, Tex., to cost $80,000. Organization has recently arranged for increase in capital from $200,000 to $300,000 to carry out expansion.

Lynchburg Foundry Co., Anniston, Ala., plans rebuilding part of finishing department recently damaged by fire.

Board of Aldermen, Oakdale, La., contemplates installation of a municipal electric light and power plant, and will secure estimates of cost soon.

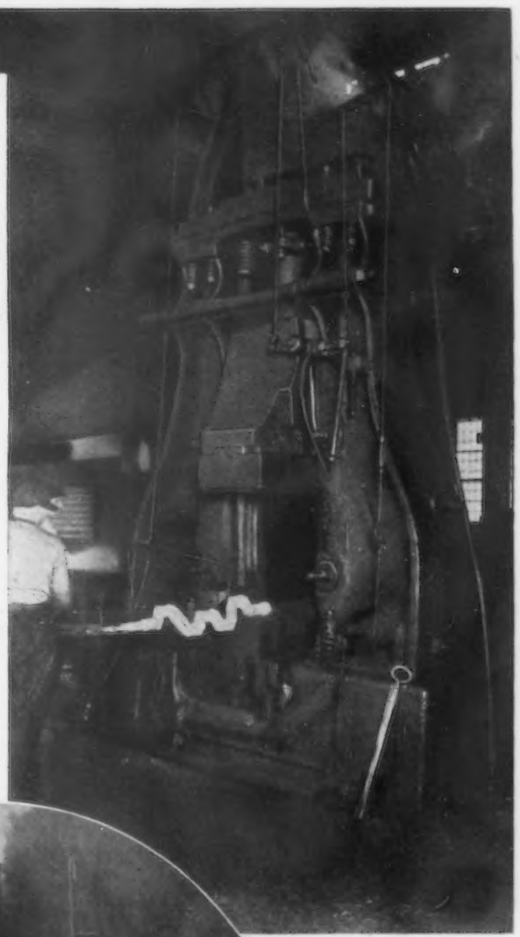
Southern Advance Bag & Paper Co.,

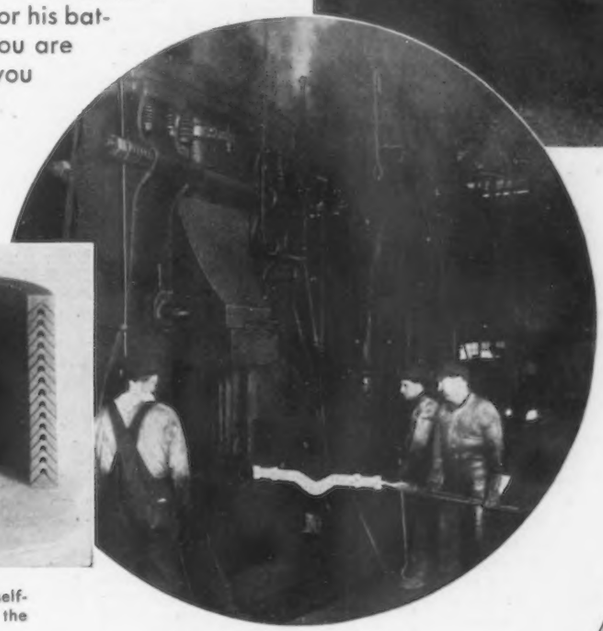
These Big Hammers Needed GARLOCK CHEVRON Packing

It takes something better than ordinary packing to stand up under the relentless pounding and vibration of the piston rods on these big hammers. That's why this forge plant turned to Garlock Chevron Packing when other materials failed.

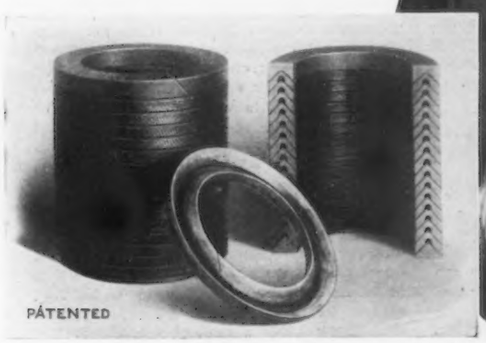
After 7 months, working two shifts—more than 2500 hours of actual operating time—Chevron still was on the job. Hour after hour it did its work under the terrific punishment resulting from the forging of crank shafts and front axles. The packing also had to contend with a considerable amount of condensation.

No wonder this manufacturer standardized on Garlock Chevron Packing for his battery of steam hammers. If you are operating similar equipment you also need Chevron Packing. Let the Garlock representative tell you the story.





Forging crank shafts and front axles in one of the world's largest industrial plants. These hammers are packed with Garlock Chevron Packing.



Garlock Chevron Packing. Note the self-adjusting construction. The greater the pressure the tighter it packs.

THE GARLOCK PACKING COMPANY

PALMYRA, NEW YORK

A World Wide Organization with Sales Offices and Warehouses in All Principal Industrial Centers

GARLOCK

Hodge, La., manufacturer of heavy paper bags and containers, kraft stocks, etc., has awarded general contract to Ingalls Iron Works, Birmingham, for an addition to cost over $100,000 with equipment. Company is operated by Advance Bag & Paper Co., Inc., 38 Newbury Street, Boston.

City Council, Ruston, La., has called a special election on July 21 to approve a bond issue of $180,000, fund to be used for erection of a municipal gas plant and system. Charles C. Goyne, mayor, is active in project.

Browning-Ferris Machinery Co., Exposition Avenue, Dallas, Tex., is planning new one-story storage and distributing plant at San Antonio, Tex., where site has been secured, to cost about $24,000 with equipment.

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Pacific Coast

DUNSMUIR High School District, Dunsmuir, Cal., has authorized plans for a one-story vocational training shop at local high school, 50 x 160 ft., to cost about $40,000 with equipment.

Fresno Precooling & Cold Storage Co., Fresno, Cal., is planning a new two-story and basement refrigerating and precooling plant, 100 x 150 ft., to cost close to $100,000 with equipment.

Napa Mutual Fruit Dehydrating Co., Ltd., Napa, Cal., recently organized by William Bohen and R. E. Minahen, both of Napa, with capital of $75,000, is planning a new fruit dehydration plant at West Napa, initial unit to cost over $50,000 with conveying and other equipment.

Las Vegas Gas Co., Ltd., Las Vegas, Nev., has plans for a new artificial gas plant and system, to cost over $80,000 with equipment.

George A. Smith Turntable Co., care of Tanner, Odell & Taft, Van Nuys Building, Los Angeles, attorneys, recently organized with capital of $3,000,000, plans operation of plant for manufacture of steel turntables for locomotives and other service. Company is headed by Thomas J. Salter and George E. Marshall, both of Las Vegas.

Board of Education, Portland, Ore., plans installation of manual training in new Irvington school, to cost $270,000, for which plans will be prepared by George E. Jones, Administration Building, East Sixth Street, architect.

Willis E. Straight, 1022 Nottingham Street, Portland, Ore., is at head of project to erect a plant in this vicinity for production of acids, initial unit to cost over $100,000 including equipment. Hemlock bark, a source of waste from paper mills in this section, will be used as raw material. A company will be organized to carry out project.

A. R. Maas Chemical Co., 308 East Eighth Street, Los Angeles, manufacturer of industrial chemicals, has awarded general contract to Escherich Brothers, 234 West Thirty-seventh Place, for a one and two-story plant unit, 55 x 137 ft., to cost over $60,000 with equipment. H. Roy Kelley, Architects Building, is architect.

Board of Public Works, City Hall, San Francisco, has awarded general contract to Clinton-Stephenson Co., Monadnock Building, for alterations and improvements in hangar No. 1 at Mills Field municipal airport, to provide facilities for three mechanical shops. Bureau of Architecture, City Hall, is architect.

Hess-Schoffield Automotive Engineering Co., Twelfth Street and Maple Avenue, Los Angeles, manufacturer of automotive equipment, parts, etc., is planning erection of a one-story plant at Anaheim, Cal., to cost about $30,000 with equipment.

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Indiana

A STOCK issue totaling $50,000 has been arranged by Superior Automatic Phonograph Co., Huntington, organized about two years ago but inactive since that time, and operations will soon begin at a local factory for manufacture of automatic talking machines and parts.

Quartermaster Depot, Jeffersonville, plans early call for bids for new air corps hangar at Bowman air field, Taylorsville Road, Louisville, Ky., including mechanical shop, storage and distributing unit, headquarters and operation building, parachute building, etc.

Board of School Trustees, Camby, John Routon, in charge, contemplates installation of manual training equipment in new high and grade school, two stories and basement, 65 x 196 ft., at Valley Mills, to cost $125,000, for which bids have been asked on general contract. Charles Byfield, Peoples Bank Building, Indianapolis, is architect.

Board of Public Works, Garrett, has plans for a two-story and basement addition, 25 x 74 ft., to municipal electric light and power plant, to cost about $70,000 with equipment. A. M. Strauss, Cal-Wayne Building, Fort Wayne, is architect.

Continental Car-Na-Var Corpn., Watseka, Ill., manufacturer of industrial chemicals, is installing equipment in former factory of Stout Furniture Co., Brazil, acquired a few months ago, and will have plant ready for service soon. Watseka plant is being removed to new location where capacity will be increased and production concentrated in future.

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Canada

PLANS are under way by Imperial Oil, Ltd., 56 Church Street, Toronto, for erection of a refinery at Sarnia, Ont., to cost $1,000,000.

Construction is under way at Lachine, Que., on bronze and iron foundries and power house for Jenkins Brothers, Ltd. Other buildings to be erected include machine shops, laboratory and office building, entire project to cost $375,000.

Iron Fireman Mfg. Co., Inc., Portland, Ore., manufacturers of automatic coal burners, etc., has leased space at 18 Beverley Street, Toronto, for a Canadian branch plant. A company will be organized and production will start soon.

D. A. Grover, president and general manager, Lone Star Timber, Lumber & Paper Co., Seattle, Wash., recently announced that his company is considering establishment of pulp and paper mills on west coast of Vancouver Island, which will represent an expenditure of about $6,000,000.

British Columbia Electric Railway Co., Ltd., Vancouver, has filed plans with J. C. MacDonald, provincial water comptroller, for development of 175,000 hp. on Campbell River. Plans call for power plants at Trout Pool, Elk Falls and Lodore Falls, entire project to cost $10,000,000. E. E. Carpenter, care of British Columbia Electric Railway, is consulting engineer.

Western Oil Co., Ltd., Moose Jaw, Sask., will start work soon on erection of an oil refinery to cost $125,000.

Raymond Sugar Co., Raymond, Alta., will spend about $35,000 on additions to sugar mill.

M. Y. Alvazoff and associates have taken an option on 37 acres on Lulu Island, Fraser River, New Westminster, B. C., and contemplate erection of a drydock, to cost $1,000,000.

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Foreign

MUNICIPAL Government of Milan, Italy, is considering erection of a municipal refrigerating and ice plant, with storage and distributing facilities, to cost over $750,000 with machinery.

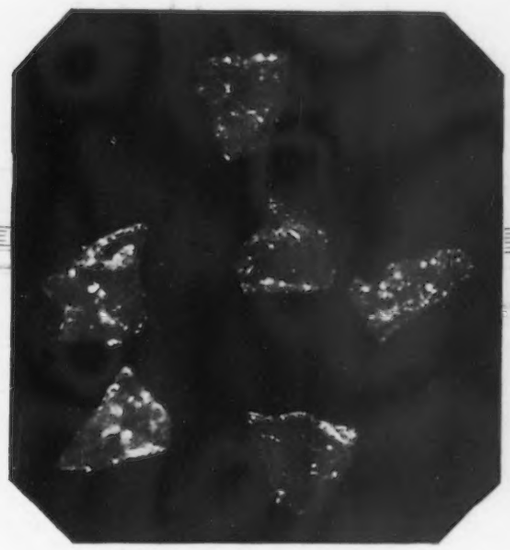
Three manufacturers of automobiles near Prague, Czechoslovakia, comprising Skoda Works, Tatra Works and Ceskomoravska Kolgen Danek, have arranged for consolidation for centralization of management, purchases, distribution, etc. Each company produces a different type of car and all plants will be continued, with development of standardized parts and equipment for increased production efficiency.

Soviet Russian Government, Moscow, has begun erection of two new plants at Vladikavkaz, North Caucasus district, one unit for production of zinc, and other unit for manufacture of lead. Both plants will be electrically operated, energy to be furnished by hydroelectric generating station at Gizel Don, now in course of erection. Amtorg Trading Corpn., 261 Fifth Avenue, New York, is official buying agency.

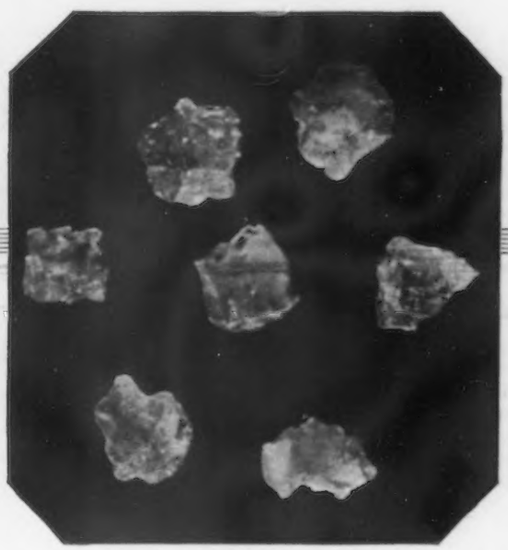
Department of Public Works, Sydney, New South Wales, Australia, is asking bids until Aug. 31 for two-motor-driven vacuum pumping units with accessories for Southwest Tablelands water supply system.

Kreuger & Toll Co., Stockholm, Sweden, operating match plants, electric light and power utilities, and other industrial properties in different countries, is closing negotiations with Government of Republic of Columbia, S. A., for a concession for match plants under a monopoly arrangement. Company proposes to pay from $10,000,000 to $15,000,000 for concession, and will proceed with establishment of plants and bulk distributing facilities, to cost over $2,000,000.

THIS THING CALLED SURFACE TENACITY



Microphotograph of regular or untreated "Aloxite" grain. Note the smooth, shiny transparent, "clear" surfaces. No real surface tenacity.



Microphotograph of Aloxite Brand "TP" Grain. Note the roughened grey, opaque, surfaces. This is the grain with surface tenacity.

It's a very definite quality which we have literally "built into" Aloxite "TP" Polishing Grain.

And we are the originators of this improvement.

Surface Tenacity is what gives "TP" its bulldog grip—"TP" stays with the wheel until worn—until it has done its full duty.

Surface Tenacity gives it greater glue adhesion—greater holding power—and it's a fixed, permanent quality.

"TP" is laboratory controlled—a clean grain well formed, angular, fast cutting and free from "lazy" non-producing flats and splinters.

"TP" packs readily—holds in the green—grips tenaciously on the dried set-up wheel.

Then too, it is uniformly graded—hard, sharp, tough.

But the best way to prove the qualities of "TP" is to give it a trial in your polishing room.

[Glad To Send Working Samples]

ALOXITE BRAND "TP" POLISHING GRAIN

REG. U. S. PAT. OFF.

THE GRAIN WITH SURFACE TENACITY

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.

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CANADIAN CARBORUNDUM CO., LTD., NIAGARA FALLS, ONT.

SALES OFFICES AND WAREHOUSES IN New York : Chicago : Boston : Philadelphia : Cleveland : Detroit : Cincinnati : Pittsburgh : Milwaukee : Grand Rapids : Toronto, Ont.

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Business as Others See It

Digest of Current Financial and Economic Opinion

DISAPPOINTMENT that the much-heralded moratorium has not at once resulted in better business volume is making itself heard. Hence the warning goes forth that that is only a single step. But the "drawn-out dickering" produced an unfortunate repercussion and largely neutralized the ebullient spirit with which the program was first hailed.

"Probably the chief result . . . has been in arousing confidence," says *Financial Chronicle*, "and that of itself, at the present moment, is a very considerable service. . . . Recovery in trade for quite a while will be slow, and perhaps be quite gradual. The most that can be said just now is that, from current indications, the corner has been definitely turned."

Emphasizing both these points, the Cleveland Trust Co. regards the moratorium as an emergency measure . . . "only a first step in a series of international accords so directed as to grapple with the fundamental problem of the depression—the continued decline in the prices of commodities entering into international trade." . . . And "discussions are under way directed to bringing back to early action large projects which have been lying dormant."

George E. Roberts (National City Bank of New York) sees the President "acting upon the conviction that it is easier to maintain a state of social and financial order than to reconstruct one after it has broken down." *Commerce and Finance* feels that if "some way of putting Germany on a paying basis is soon found," there will be "widespread business revival."

Watch Commodity Price Levels

Other observers point to the necessity to watch world commodity prices, "as probably more reliable indicators of changing basic conditions than any other." But New York *Times* suggests the advisability of buying industrial materials now for future requirements and notes "recently some relaxation of strict hand-to-mouth contracts." This paper thinks it "possible that replacement demand may not be altogether so large as is commonly imagined."

Persistently high stocks of commodities in both Britain and France are cited by Harvard Economic Society as a disquieting feature. And a problem we have to face in this country is the disposal of 200,000,000 bu. of wheat without breaking the world markets.

Freight rates are discussed by Alexander Hamilton Institute with relation to commodity prices. Yearly averages, 1913 to 1930, are quoted, showing the corresponding ratio—freight to price—of 56.3 per cent (the low) in 1917 and 120.7 (the high) in 1921. At 113.7 in 1930, second highest of the series, the Institute thinks an addition of 15 per cent, with the concurrent (and already existing) drop in commodity prices, will "place a heavier burden on shippers than they would be willing to bear for any prolonged period." And car loadings are decried as a measure of activity because "the amount going by motor truck is not available," this being estimated at double what it was two years ago.

With most instalment and other debts paid, Poor's sees "an increasing portion of the national income available for purchases," etc. After the summer quiet, that service looks for "further gradual improvement in general business through the autumn and to the end of the year."

With money in circulation only 1 per cent down from 1929, national income of 23 per cent and prices in about that proportion, New York *Herald Tribune* sees the effective value of money greatly enhanced, with "tremendous buying power in the nation, although poorly distributed."

New Trade Publications

Clutches.—Carlyle Johnson Machine Co., Manchester, Conn. Friction clutches of single and double type are featured in a bound series of single-page reprints. An installation information blank is included.

Pyrometers.—Brown Instrument Co., Philadelphia. Illustrated 48-page catalog outlines operating principle, industrial applications and special features of the potentiometer pyrometer that was described in THE IRON AGE of June 4. Also an attractive two-page circular on the same instrument.

Turret Lathes.—Gisholt Machine Co., Madison, Wis. Bulletin No. 2A, two pages, describes new Nos. 4 and 5 Gisholt turret lathes.

Pillow Blocks.—S K F Industries, Inc., 40 East Thirty-fourth Street, New York. Ball and roller bearing pillow blocks and shaft hangers are illustrated in a new catalog containing dimensions and price lists.

Preloaded Ball Bearings.—S K F Industries, Inc., 40 East Thirty-fourth Street, New York. The mounting of precision spindles of machine tools in preloaded ball bearings is discussed in pamphlet No. 203, 20 pages. Illustrations show the method of installing these bearings on lathes, grinders, milling, boring and other machines.

Welded Bases.—Lincoln Electric Co., Cleveland. One of a series of engineering data sheets devoted to the design and fabrication of machine bases by welding structural steel.

Grease Lubrication.—Ideal Lubricator Co., Packard Building, Philadelphia. The Ideal system of grease lubrication from a central distributor through a regulating valve at each bearing is illustrated and described in a 30-page booklet.

Water Level Indicator.—Schutte & Koerting Co., Philadelphia. The water level "Televisor," an electrically operated device for boilers or tanks that provides a water level gage at any point desired, is described in bulletin No. 15-A.

Hack Sawing Machines.—Armstrong-Blum Mfg. Co., 333 North Francisco Avenue, Chicago. Bulletin No. 600, 16 pages, devoted to Marvel line of high-speed hack sawing machines. The new units are equipped with anti-friction saw frame slide and include plain, single cut and full automatic bar feed models.

Metal Cribbing.—American Rolling Mill Co., Middletown, Ohio. An 8-page pamphlet illustrating and describing the company's recently developed metal cribbing, formed in sections from galvanized ingot iron sheets. It is furnished in 6 and 8-ft. standard lengths and the maker claims that unskilled labor can be used in constructing retaining walls.

Steel Catalog.—Steel Co. of Canada, Ltd., Hamilton and Montreal, has issued a revised edition of its general catalog which conforms to the standard adopted by the National Association of Purchasing Agents. The catalog contains 228 pages, fully illustrated, and the order of its contents follows the successive stages in the manufacture of steel, from basic materials to finished lines.

Bearings.—New Departure Mfg. Co., Bristol, Conn. Insert sheet, giving engineering information on the application of ball bearings in deep-well pump motors and in industrial clutches.

Control Systems.—Shallcross Control Systems Co., Milwaukee. Looseleaf catalog, describing various control systems, outlining purposes, designs, construction, maintenance, etc.; Bulletin 100 is devoted to discussion on furnace draft control.

Tramrails.—Cleveland Electric Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, Ohio. Illustrated leaflet, covering materials handling in the foundry.

Bearings.—Wagner Electric Corpn., St. Louis. Bulletin S-349, discusses the problem of bearing seizure in electric motors, pointing out advantages of steel-backed babbitt-lined bearings.